The International Publication of the Southern California Computer Society

SCCS INTERFACE™

Vol. 1, Issue 9,
December 1976
$1.50

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Computer Stores

Floppy Disk Operating System

Universal Cassette Interface System

003454-00

Introducing A Remarkable New Microcomputer:

The Astral 2000

You're reading this ad, so you're obviously interested in getting a microcomputer. You're probably also a bit confused by the number of different microcomputer kits around today. So, think about the things you want in a microcomputer. *Ease of assembly, quality power supply, well designed cabinet and interconnect scheme, peripheral and memory options for an expanding system.*

Some Kit!

Although we have called the Astral a "kit", it actually arrives over 70% assembled. The power supply, processor board and RAM board are fully assembled, burned in and tested before shipment.

There is no complicated wiring harness. In fact, there is no front panel wiring harness at all. The front panel plugs directly into the backplane. Additional circuit boards are inserted through the rear of the chassis directly into the backplane.

Complete System

The Astral 2000 is shipped with power supply, cabinet, front panel components, mother board, processor board and one 8K RAM board. The processor is 6800-based and operates in serial and in parallel. Both RS-232 and 20mA current loop are provided by a serial I/O socket on the processor. This processor is shipped with our own 16K monitor ROM and has provisions for "cycle-stealing" DMA. The memory board contains 8K of low power, 500ns static RAM and uses less than 1.5A at 5V.

Lots Of Options

A computer isn't much fun if you can't talk to it. But you can talk to the Astral with the VID-80 video terminal board for only $189.95 unassembled ($245 assembled). The VID-80 has a selectable line length of 64, 72 or 80 characters per line. It displays 16 lines of upper case characters but gives you the option of installing a lower case character ROM as well.

We also have someplace for you to put your programs. Our 8K EPROM board ($59.95) is designed for the 5204 and will allow in-system program storage even during power-down. This board is assembled with all components except the EPROMs, however sockets are provided for the memory chips.

We've solved program loading, too. The I/O tape interface unit ($49.95) plugs into the I/O socket on the processor board and allows programs to be loaded from any inexpensive, non-digital tape deck. But if tape cassette isn't fast or big enough, a floppy disk with an Astral bus-compatible controller will be available for under $1,000 in the last quarter of 1976.

A New And Powerful BASIC

A unique and powerful version of BASIC with features never seen before in an 8K version has been designed especially for the Astral system. Astral BASIC contains all the features of competing BASICs and then some; Astral BASIC is also *very* fast.

With the *User Selectable* Floating Point package, the user chooses the degree of precision from the four choices of 6, 9, 13 or 16 digits. Fewer digits use less memory and is faster, however higher precisions are useful for scientific and mathematic applications.

The Astral BASIC's DO statement is unique; it has never appeared in any other version of BASIC. The DO statement is a simple and flexible way to subroutine without the restrictions of formal subroutines. DOs can be nested, too and — of course — Astral BASIC has all the other standard subroutine procedures as well.

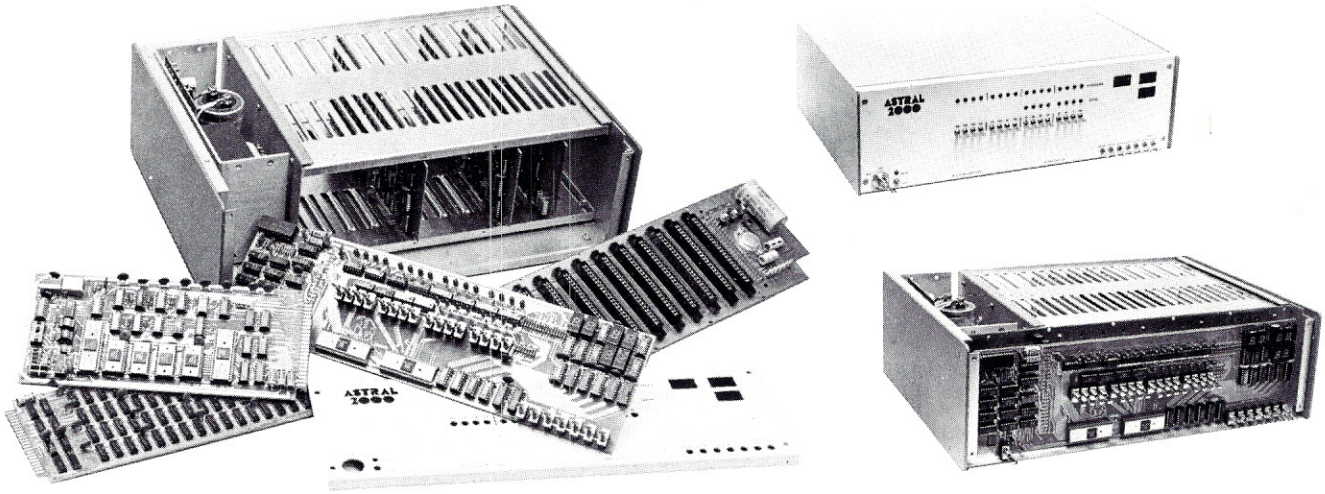
The Trace Mode is another feature rarely found in other BASICs. The Trace Mode is used in program debug to list statement line numbers as executed. This feature may be programmed to Trace On only for routines still needing check-out. Pressing the escape key halts the trace and returns control to the terminal.

The Astral BASIC string facility permits *variable length strings of unlimited length* and includes the ability to search for a substring within another larger string, a particlularly useful feature for word processing applications.

Powerful program editing capabilities allow loading, listing and saving of programs. Blocks of statements may be deleted or renumbered. The RENUMBER statement may be used to increment all specified line numbers and it automatically adjusts the numbering of any GO TOs, etc.

Another feature never seen before in an 8K version is the popular PRINT USING statement. PRINT USING permits floating "$", "+" and "-" signs as well as floating commas, so numbers such as $1,000,000+ can be printed in the standard accounting format.

m&r enterprises
P.O. box 61011, sunnyvale, california 94088



The Astral 2000 is $995 partially assembled ($1250 fully assembled) plus $14 for shipping and handling ($18 for Canadian orders). Additional 8K RAM boards are $245 each. California residents add 6% sales tax. The Software Package includes Astral Basic on magnetic tape cassette or paper tape, the game of Startrek, complete documentation and a free one year subscription to the Astral Newsletter, *all for $35. For more details, send a self-addressed, 8½ by 11 stamped envelope to M&R Enterprises, P.O. Box 61011, Sunnyvale, Ca. 94088. Allow approximately 8 to 12 weeks for delivery.*

Circle No. 1 on Inquiry Card

Thank You For Waiting!

Here it is at last, volume 1, number 9 of SCCS Interface.

I really don't have time (or space) to write a formal editorial covering all of the events and changes which have occurred during our absence. The most traumatic one for me was that, shortly after I became editor, our publishing service informed me that they had decided to publish their own, independent magazine. A lot of the time since then has been spent in searching for new people to replace them.

While this has cost us a lot of time and money, it has had some payoffs as well. We now feel free to publish exactly what we and the members of SCCS wish, to be objective with regard to vendors products and services, to report society news, and to provide an open forum for members and chapters. We can even experiment a bit; we can play with our magazine.

We are freed up to ask basic questions about the magazine and make changes if we wish. For example, we have tentatively decided to continue carrying ads because they will help us keep dues down and they make interesting reading, but we are aware of the dangers in doing so. We decided to retain the "slick" look of the magazine in order to maintain continuity with advertisers and readers in spite of the additional cost. We have decided to carry news of chapter activities and allow for many more short contributions from members, increasing the emphasis on Interface as a Society publication rather than a commercial magazine. We have altered the format of the magazine – going to three columns and a new typeface.

Decisions such as these are not fixed; *none* were made unanimously and we would like your feedback on them.

The one sort of change I do want to take the time and space for is the introduction of some of the new people we've got working with us, because, they are the most important change.

The first new person is me, Larry Press. I've been professionally involved with computers since 1960, mostly as a professor and at various research institutes. I'm turned on by the accessability and understandability of micros and the openness and fluidity of the clubs. That's why I decided to put energy into SCCS – I didn't know how much I'd put in.

Next is Karen Wolff, our new assistant editor. Karen is not a computer person, but an artist. Her work has appeared in galleries and museums in and outside the L.A. area. In addition to taking care of much of the real work in getting the magazine together, Karen brings a fresh editorial perspective. For instance, on visiting Lou Fields' research lab, she saw him as "an artist in a different media"; when we fired up a MITS 680 kit for the first time, it was "like being in a room where a baby was just born" and the 680 PROM monitor – "its instincts".

Don Tarbell will be an associate editor. Everyone knows that Don is the designer, manufacturer and purveyor of the Tarbell cassette interface. Fewer people know that the first historic SCCS meeting was held at Don's apartment on father's day, 1975. Don has a broad professional background and has indicated that, inspite of being a hardware manufacturer, he would like to contribute most heavily in the area of software.

Bob Allbrecht will also be an associate editor. Bob claims to be the world's first home computerist in that he had an LGP-30 at home in the late 1950's. He also claims to be a dragon, at times. He is responsible for starting all sorts of neat things like the first public access computer center, Peoples Computer Company, Dr. Dobbs Journal, the DYMAX publications and the Great San Andreas Fault Caper. Bob has even worked for Control Data Corporation.

Jim Carlstedt and Jim Levin are an associate editor team, whatever that means. They are both members of the research staff at the Information Sciences Institute of the University of Southern California. Jim and Jim both relate to the academic computer science community and hope to narrow the gap which exists between the hobbyist and the computer scientist. They want to keep us from reinventing the wheel and keep us up to date on what is happening in their world. Jim Carlstedt's specialty is operating systems and Levin's is models of cognitive processes. Jim Levin comes from Carnegie Mellon University and Jim Carlstedt was at RAND for a very long time (he is even older than I) and at SAAB in Sweden before coming to ISI.

We have been through some costly setbacks, but are hanging in. We are unable to pay authors at present, except with complimentary memberships and positive Karma. I would like to close by thanking the advertisers who supported us – we will support you.

Larry Press
Editor

Photo by John and Samantha Press

Join SCCS now and keep pace with what's happening in computer technology!

An informal, international organization of computer buffs, the Southern California Computer Society (SCCS) was founded in 1975. Today its roster boasts more than 8000 members. This explosive growth stems in part from the benefits that members enjoy because of SCCS's busy, well planned agenda of activities and services. Here are some of the functions the society's governing body perform to help computer professionals and nonprofessionals alike cope more effectively in a world where the giant computer threatens to dominate our lives:

Conducts meetings, seminars, and lectures... Publishes books, newsletters, and a monthly magazine... Provides informal technical assistance... Arranges classes... Develops and maintains workshops... Scholarships for classes and memberships... Renders an ombudsman service... Arranges group purchasing agreements... Performs job placement services... Supplies video presentations for society and chapter meetings... Helps local chapters organize meetings and recruit members... Coordinates relationships with other technical societies and specialty groups.

No other society does more for its members. But why not join and find out for yourself. Your annual dues include a subscription to Interface, SCCS's official publication.

Distributed monthly, Interface contains news and information about industry trends in microprocessors and microcomputers and local chapter meetings. It also reviews the merits of newly announced equipment and books about computers. It is a professionally produced publication with interesting, carefully edited computer application articles and tutorials.

Membership in SCCS is open to everyone who has a sincere interest in the computer arts and sciences. And remember: whether your interest is professional or nonprofessional, there's no better way to become informed and stay informed. Convinced? Then just complete the application form and return it with your $10.00 annual membership dues (going up in February). Do it today and begin to enjoy the benefits of belonging to SCCS. Not convinced? Then write or call to get the society's membership folder, which describes the society's aims, services, and activities in more detail.

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sccs INTERFACE™

VOL. I, ISSUE 9 **DECEMBER 1976**

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Cover Story

This month's cover features computer stores and Dick Heiser, who, along with his wife Lois, opened the first computer store "way back" in 1975. Dick's store, and the Byte Shop and Computer Shack chains are discussed in the computer store articles beginning on page 22.

THE NATIONAL PUBLICATION OF SOUTHERN CALIFORNIA COMPUTER SOCIETY

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PUBLISHER'S STATEMENT

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Microcomputers are highly complicated devices. When you buy one you want to make sure the manufacturer has a solid reputation for reliability and support. You want to make sure he'll be in your corner a year or two down the road.

The Altair™8800 from MITS was the first general-purpose microcomputer. Today, there are more Altair computers up and running than all the other general-purpose microcomputers combined. Today, Altairs are successfully used for literally hundreds of personal, business, scientific, and industrial applications.

Because we are so popular, many people have tried to copy us. The pages of microcomputer magazines are full of advertisements for Altair compatible devices and Altair imitation computers.

Because we are NUMBER ONE, we offer a much broader range of products and services than any of our competitors. One manufacturer might be able to copy one of our computers. Another might be able to produce a working memory card. But no one can copy the overall Altair concept.

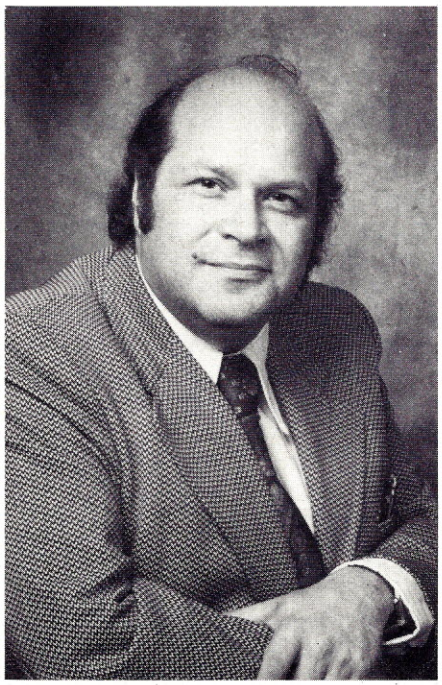
The Altair concept is a system concept aimed at practical, cost effective applications. That's why we offer three mainframes including the Altair 680b, Altair 8800a, and Altair 8800b; ten peripherals including a multi-disk system; and over 20 plug compatible modules including our new, low power 16K static memory board. That's why we are the only microcomputer manufacturer to go to the extra expense of providing our customers with quality, higher language software.

When you buy an Altair, you're not just buying a piece of equipment. You're buying years of reliable, low-cost computing. You're buying the support of the NUMBER ONE manufacturer in the microcomputer field.

2450 Alamo SE/Albuquerque, NM 87106/505-243-7821

The President's Column

How can an international organization serve the needs of the individual experimenter, hobbyist, personal and home computer enthusiast? At the same time, how can it help fill some of the needs of the small systems user, the OEM, and the educator?



The Southern California Computer Society (SCCS) is structured to provide a strong central coordinating body with nearly autonomous local chapters throughout the world. These chapters comprise groups of 6 to 300 members and are encouraged to establish their own style and format. This style is to conform to the needs and personalities of the regional organizers, using the models of both the parent organization and the other chapters. The articles of their local charters of course include conformance with the Society's by-laws. We have found a pleasant range of styles among the chapters. This includes such options at meetings as formal speakers verses workshops, commercial vendors or not, local dues and/or meeting charges. Hardware facilities, software libraries, audio-visual aids, classes are all chioces available as the assets and interests permit. Local chapters provide the very valuable, perhaps essential, one-to-one contact which so much enhances learning; and information exchange of hardware and software knowledge.

What does the international organization do for the individual?

There are many activities which are economically most feasible with the aggrigate buying and funding of many members. For example, liability insurance is frequently required and is essential to obtaining free or low-cost meeting places; such as schools and industrial plant cafeterias. Because of high initial costs, this kind of service is far more practical for the combined membership of many thousands, than for a small group of members, keeping in mind that even our small local chapters grow quickly to include hundreds of members which require such meeting places.

*Newsletters and publications are vital for meeting notices and exchanging data.

Without the non-profit status which allows low-cost mailings, and without the opportunity of a publication large and widely enough distributed to produce a satisfactory vehicle for advertising, the per-member publication and mailing charges would quickly exceed any reasonable club dues. The same economies apply to other shared services as accounting, group purchasing of books, audio and video tape lectures, software libraries, laboratory-workshops.

The true inspiration that widely dispersed individuals and groups can share symbionically is our real strength. Member loyalty has been very heartwarming and dramatic. The spontaneous donation of assistance funds was surprising and most insightful of the members.

I would like to take this opportunity to greet all of our old and new members. We all have a rare and special privilege of being at the forefront of the most exciting technical achievement to date, to find common usage. My view is that the application of micro-computers to our business, science and everyday life will soon come to have an impact greater than the influence on our lives of either electricity or the automobile. It is with the feelings of awe, respect, investigation, and fun that I look forward to joining with you on this marvelous and most noble adventure.

Respectfully,

Louis G. Fields
President

EXPLORE THE FANTASTIC COMPUTER WORLD

THE AFFORDABLE

BYTE SHOP

COMPUTER STORE

AT THE BYTE SHOP of Pasadena. In a cheerful and comfortable environment, you can experiment and play with the many systems we have up and running. Ask us anything you need to know about computers. Let us help you design your new system. Join our classes and workshops to get your hardware and software working. Or just buy replacement ICs and tools. We'll bet what you're looking for is here. If it isn't we'll get it.

TRY THEM FOR YOURSELF

If you're in the dark about which computer is right for you, play with systems up and running every day at the BYTE SHOP. Experiment with games or other applications on computers we've hooked up to every type of peripheral. A tough choice becomes easier when you can sit down and compare computers for yourself.

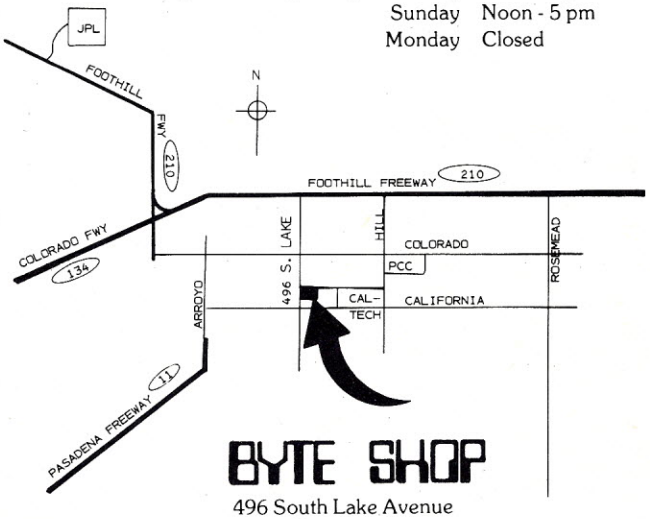
EVERYTHING FROM APPLE TO ZILOG

Whatever you've dreamed about for your system is here. Just a few of the computers at the BYTE SHOP are IMSAI 8080, Poly 88, SwTPC 6800, Apple Computer, TDL's ZPU, and more. Peripherals like Decwriter, iCOM's Frugal Floppy and the ADM-3 Terminal are on the shelf. Interfaces and accessories like Tarbell Cassette, boards from Cromemco, Processor Technology and many more are in stock. We can give you your dream system now and arrange a "Byte-a-Month" plan especially for your budget.

CLASSES AND WORKSHOPS

There's a class or workshop designed especially to provide what you need to feel like a well rounded computer person. Beginning programming classes, taught by enthusiastic experts, will help you talk with your computer. A hardware assembly workshop will give you some of the tricks of the electronics trade. A workshop for professionals will explore advanced program design techniques.

Open Tuesday through Saturday Noon - 9 pm
Sunday Noon - 5 pm
Monday Closed



BYTE SHOP

496 South Lake Avenue
Pasadena, California 91101
Telephone: (213) 684-3311

Circle No. 3 on Inquiry Card

Calendar

Calendar needs announcements of meetings and events. Send meeting dates, locations, hours and a phone number to contact for information to:
Karen Wolff,
P.O. Box 5429,
Santa Monica, California 90405
or call (213) 396-0048.

NOVEMBER 20
Los Angeles Chapter (SCCS meeting. Speaker: Bob Marsh on, *"The SOL Intelligent Terminal"*. Bob is one of the Founding Fathers and Vice-President of Processor Technology. He considers himself, "a long-time computer anarchist". Speaker: Bob Ripley on, *"Core Memory and Systems"*. Bob, a member of SCCS, is an engineer at Ampex Memory Products Division, and will place special empahsis on hobbyist applications to Core Memory.

NOVEMBER 20
Ventura County Computer Society (SCCS) meeting. Contact Bill Cowley, 985-2631 or Fred Moeckel 982-5852 for details.

NOVEMBER 22
Minnesota Computer Society (SCCS) Chapter Meeting 7:30 PM, Hennepin Co. Library, 7001 York Ave. So., Edina

DECEMBER 1
San Fernando Valley Chapter (SCCS) meets the first Wednesday of every month at 7:30 PM., Harvard School, 3700 Coldwater Canyon Ave., Studio City. Call John Scott, 849-7111, for information.

DECEMBER 2
Amateur Computer Group of New Jersey, 8080/Z80 Users' Group meeting 7:00 PM, U.C.T.I., Scotch Plains, N.J.

DECEMBER 3
Long Island Computer Association, Special Meeting, 8:00 PM, N.Y. Inst. of Tech., Bldg. 500, Rm. 508, Old Westbury. Don Rein of Mostek – Z-80 in depth.

DECEMBER 4
The Computer Hobbyist Group–North Texas, UTD Richardson Group meeting 1:00 PM, UTD Green Center, Room 2.530, Richardson. Contact: Neil Ferguson, 116 Woodland Cir., Arlington, TX 76013.

DECEMBER 6
AMRAD (Amat. Radio Res. & Dev. Corp.) meeting 8:00 PM, Patrick Henry Library, Vienna/"Oscillators" John Nagle; Election of Directors.

DECEMBER 9
Amateur Computer Group of New Jersey, 6800/650X Users' Group meeting 7:00 PM, U.C.T.I., Scotch Plains, N.J.

DECEMBER 13
The Minnesota Chapter (SCCS) meeting. Contact Jean Rice, P.O. Box 35317, MN 55435. Except for this special December date, meetings are held on the 4th Monday of each month.

DECEMBER 14
Santa Monica Bay Chapter (SCCS) meeting, 7:15, W.L.A., V.A. Hospital Room 125, Bldg. 114 (this is a workshop chapter, meets 2nd Tues. of every month).

DECEMBER 18
Los Angeles Chapter (SCCS) meeting. Speaker: Lee Felsenstein on, "Community Memory–The Phantom Bulletin Board". Lee will emphasize the necessity of computer amateurs in the community. He is Toastmaster of Homebrew Computer Society and designer of the Pennywhistle Modem, the SOL Intelligent Terminal and the VDM-1 board. Speaker: Joanne Verplanck on, *"Computer Centers–Available for Community Enjoyment"*. Joanne is Director of the Community Computer Center, Palo Alto, California.

DECEMBER 18
Ventura County Computer Society (SCCS) meeting. Contact Bill Cowley, 985-2631 or Fred Moeckel 982-5852 for details. Except for this special December date, meetings are held the last Saturday of each month.

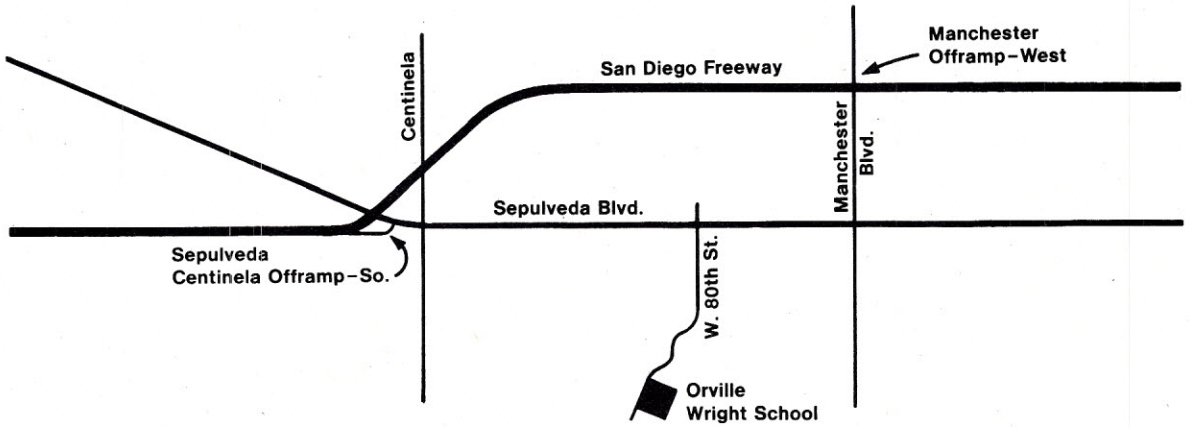
DECEMBER 18
The Computer Hobbyist Group–North Texas meeting 1:00 PM, UTA University Hall, Rm. 108, Arlington. (Meetings are usually the third Saturday of the month. Note December change).

DECEMBER 28
Pasadena Chapter (SCCS) meets the last Tuesday of every month at the Main Library in Pasadena.

JANUARY 22
Los Angeles Chapter (SCCS) meeting. Speaker: Jerry Silver on, *"Special Aspects of Basic Language"*. Jerry is a Charter Member of the Society, an Instructor at L.A. City College and a widely read author on BASIC and computers.

FEBRUARY 19
Los Angeles Chapter (SCCS) meeting. *Computer Music Symposium*– This will be an all-day program in a special theater with outstanding speakers demonstrating their areas of expertise in computer music development. Send in reservation now as there will be limited seating! Reservations are $4.00 each and are open to members and their guests. IEEE members also qualify. *Include a self-addressed envelope to insure receiving your tickets.* (PLEASE STAMP IT). Send to Bill Sinclair, Box 54751, L.A., CA 90054.

New Los Angeles Chapter SCCS Monthly Meeting Place:



New Clubs

New Clubs

Antelope Valley Computer Club held its first meeting on August 11th and its second on September 15th. For more details, contact Bill Von-Wicklen, 1541 Ave. Q-6 East, Palmdale, CA 93550.

Kim User's Group has been launched with the July issue of their first newsletter. Slated are software and hardware seminars throughout the year. The group's most valuable offering is their newsletter, to be published every 5-8 weeks. Subscription cost is $5 for the next six issues, mailed first class. To subscribe, write KIM-1 USER NOTES c/o Eric C. Rehnke, 7656 Broadview Rd., #207, Parma, OH 44134

The Southern Kansas Amateur Computer Society is off to a fast 78 member start. They are already planning a computer fair for May 28-29, 1977 in Wichita, Kansas. Contact Chris Borger, (316) 945-9658.

A Charlottesville, Virginia Club is forming. Contact George P. Harris, P.O. Box 1891, Charlottesville, VA 22903, (804) 295-9584.

A New Zealand Computer Club is being formed. Any assistance you are able to give – software, programs, schematics, information or other advice would be most welcome. B.R. Comquer, Box 27-206, Mt. Roskill, Auckland, New Zealand

The Permian Basin Computer Group has formed in Texas. There are two chapters, which meet on the second Saturday of the month at Midlands and Odessa Colleges. The first meetings featured Altair 8800s. Contact John Rabenaldt, Ector County School District, Box 3912 Odessa, TX 79760.

The Tokyo Chapter of SCCS has been formed. The contact person is Haruhisa Ishida, Associate Professor of Computer Science at the University of Tokyo. 2-11-16 Yayoi, Bunkyoku, Tokyo, Japan. Telephone 0429-23-9440. Professor Ishida also informs us that a computer store is opening in Tokyo.

Pomona Chapter Forming. Al Sutton, 4155 Oak Hollow Road, Claremont, CA 91711, (714) 593-6635 is the contact person for those interested in forming a chapter in the Pomona area.

Society News

Society News

We have all sorts of committees, most of which would probably like you to volunteer energy or at least suggestions to them. Here is a brief rundown on some of them, along with a contact person.

Publication Committee

The publication committee is responsible for the editorial and production sides of Interface. Boy do we need help! We need proofreaders, book, article and product reviewers, reporters for chapter and other activities, manuscript referees, authors, etc. Contact Larry Press, box 5429, Santa Monica, CA 90405.

Group Purchase Committee

The group purchase committee is in a state of flux. For over a year, this job has been done by a single volunteer – first Hal Lashlee then Chris Marshall. Chris lasted about as long as Hal had, but finally resigned in exhaustion in October.

It is obvious that we are going to have to pay someone to do the clerical work for group purchase and we are in the process of finding someone. Committee members will still be relied upon to arrange deals and choose offerings.

We also ran into a serious problem in that a certain supplier failed to deliver a large ($9,000) order and we are working on getting a refund from him. Since this situation has been dragging on for a long time, we have made 20% refunds to those affected and hope to catch up the rest soon. Contact Lou Fields, 11662 Sunset Blvd., Los Angeles, CA 90049.

Membership Committee

The membership committee is responsible for handling membership correspondence, maintaining the membership list, preparing brochures, and general public relations. Contact Lou Fite, 620 Illinois Ct. #9, El Segundo, CA 90245.

Ombudsman Committee

The ombudsman committee will represent you in grievances with vendors. Send written statements of your grievances to us. Contact Russ Lotter, Box 9459, North Hollywood, CA 91609.

Chapters Committee

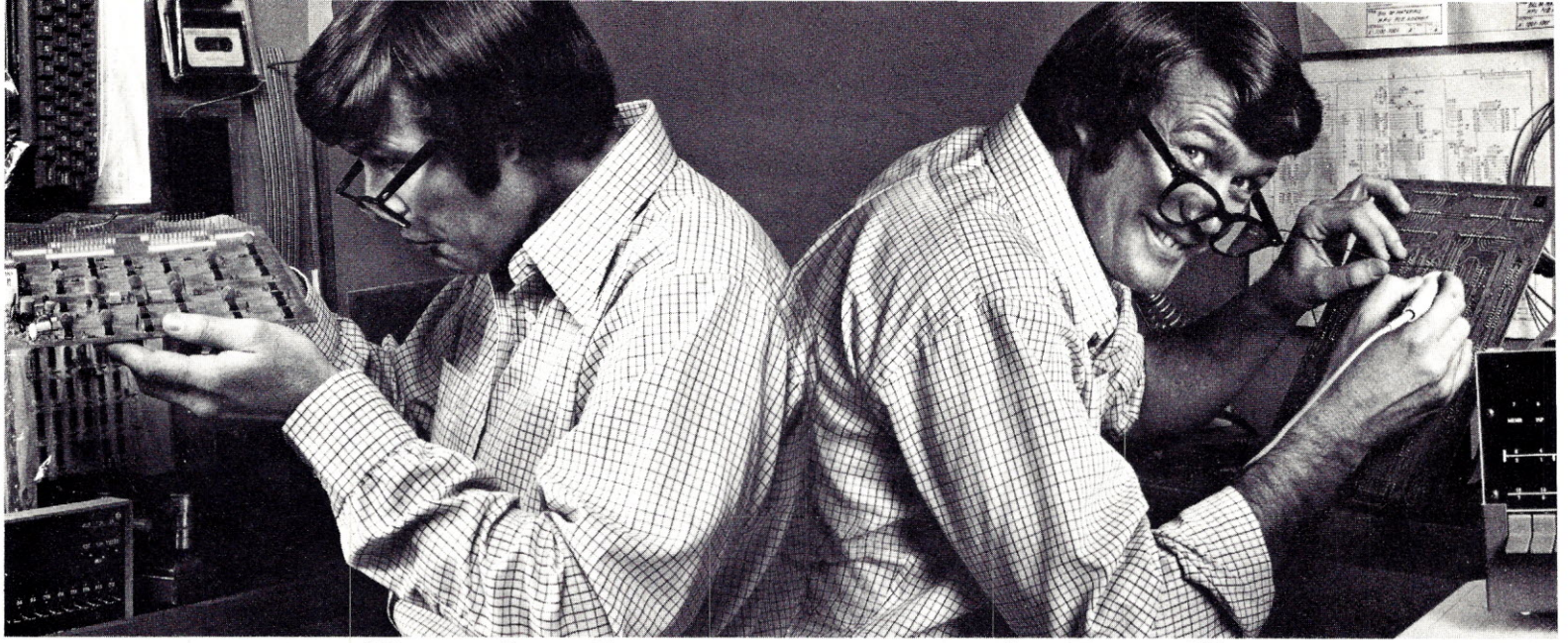
The chapters committee is responsible for maintaining a chapters register, maintaining chapter financial and meeting reports, the chapter "SOP" manual and coordinating and encouraging the development of new chapters. Contact Ken Taylor, 8528 W. Hargis St., Los Angeles, CA 90034.

Program Committee

The program committee is responsible for organizing a monthly meeting, including a technical program, swap meet and vendor displays. We will also attempt to document the content of the technical programs for dissemination. Contact George Attwood, 5711 Ravenspur Dr., Rancho Palos Verdes, CA.

Education Committee

The education committee matches teachers and workshop leaders with class sites and students. We also publicize classes and attempt to document their content for dissemination. Tuition is normally split



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Introducing The First Professional Quality Modem In Kit Form...

The Pennywhistle 103

The Pennywhistle 103 Acoustic Coupler is the first professional quality modem available in kit form. The Pennywhistle may be used either as an acoustic coupler (with the telephone handset) or it may be wired directly into the telephone. In either case, the Pennywhistle will operate in both the half-duplex (unidirectional) or the full-duplex (bidirectional) modes.

The Pennywhistle 103 is capable of recording data to and from audio tape without critical speed requirements for the recorder and it is able to communicate directly with another modem and terminal for telephone "hamming" and communications for the deaf. In addition, it is free of critical adjustments and is built with non-precision, readily available parts.

One of the most significant problems associated with modems is that there is often difficulty in determining the difference between a signal of the proper frequency and one of its harmonics. The Pennywhistle 103, however, employs a *three-stage* active filter which prevents noise and harmonics from getting through.

The Pennywhistle kit includes everything needed for the entire unit. All electronic components mount on a 5" by 9" printed circuit board. The kit also includes all chassis parts, speakers, speaker grilles, muffs and line cord.

But just as important, the Pennywhistle is backed up with a complete documentation manual. This manual describes — in detail — what a modem is and how it works. All theory of operation discussions are keyed to a block diagram and schematic. This manual also contains a thorough set of assembly, test and adjustment instructions as well as directions for hooking the Pennywhistle up for direct wire connection, modem-to-modem communication, tape recorder connection and long distance use.

The Pennywhistle 103 modem kit is $109.95 (plus $2.50 for postage and handling) and is available from M&R Enterprises, P.O. Box 61011, Sunnyvale, Ca. 94088. California residents add 6% sales tax. Allow approximately four weeks for delivery.

Circle No. 6 on Inquiry Card

between SCCS and the teacher. We need a new chairman. Contact Lou Fields, 11662 Sunset Blvd., Los Angeles, CA 90049.

Chapter News

Minnesota Computer Society Meeting

A new chapter of SCCS has formed in Minnesota – the Minnesota Computer Society. 75 people attended the first meeting held at Medtronic, Inc., 6120 Earle Browne Drive, Minneapolis. Many expressed interest in bringing others to future meetings.

A survey filled out by members indicated a wide variety of interests with regard to future meetings. In addition to interests in building home computers, trouble shooting techniques discussions, group purchasing, software development, many persons indicated an interest in computer effects on everyday life, future trends in computers, computers in the business world, how a computer works and programming.

Of the surveys returned, slightly over half had some computer-related equipment at home, 60 percent had access to some computer-related hardware.

In addition to serving as a club for computer hobbyists, the Minnesota Computer Society hopes to serve the needs of others by providing an opportunity to learn about computers. Possibilities for future plans include sponsoring classes, laboratory sessions for computer hobbyists, hardware and software displays, technical hardware presentations and general interest presentations such as futures with computers, how computers operate, their effect on society and programming languages, to name a few.

The evening program featured Vic Merryman, INTEL, who discussed BEGIN THINKING ABOUT YOUR OWN HOME COMPUTER SYSTEM; Dave Waldemar, Hennepin County Library, who spoke about the HENNEPIN COUNTY LIBRARY COMPUTER FACILITIES; and Dr. Otto Schmitt, University of Minnesota, discussing SOME OF THE MANY DISGUISES IN WHICH MICROPROCESSORS APPEAR.

The 9 original members of the steering committee for MCS – Joyce Frechette, department administrator, Diagnostics Development Systems, T.I.E.S. (Total Information for Educational Systems); Terry Hudrlik, research associate, Biophysics Department, University of Minnesota; .Vic Merryman, applications engineer, INTEL; George Nelms, senior engineer Diagnostics Development Systems, Medtronic, Inc.; Jean Rice, teacher-author; Jim Sydow, supervisor of services, T.I.E.S.; Dr. Otto Schmitt, Professor of Biophysics, University of Minnesota; Steve Weisbrod, department director, Diagnostices Development Systems, Medtronic.– spent many hours over numerous lunch times plotting the directions of the MCS. The group has now expanded to include other members of the MCS – Julie Alsworth, Jim Altermatt, Doug Askegard, Mike Canny, Doug Christensen, Gerald Murry, Bill Lawson, Tom Walstrom.

The next meeting is scheduled for December 13, with plans to include several short presentations with an opportunity to form small group discussions with each presenter. Contact Jean Rice at Box 35317 for information.

SCCS Monitors Debates

Radio station KPFK and the Los Angeles Chapter of SCCS teamed up to survey voter responses to the Carter-Ford debates. Before each debate, a questionnaire was published in the Los Angeles Newspapers. People were asked who they liked best before and after the debate, which candidate seemed better informed and which seemed more believable. They were also asked questions about themselves – their income, political party, age, etc.

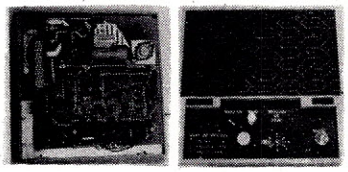
After each debate, KPFK ran a discussion and analysis program and encouraged people to call their questionnaire responses in. The calls were taken by a group of twenty telephone volunteers who coded the replies for input to an ALTAIR.

At about 15 minute intervals, printouts of cross tabulations and simple summary statistics were made and fed back to the listeners. It really worked (with the exception of a few pulled plugs during the first debate) and everyone had a high time.

Some of the SCCS folks who worked to put the whole thing together were Lou Fields, Ken Young, Phil C. De Baca, Nancy and Ray De Long. Ray's ALTAIR was used and he wrote the analysis program in BASIC.

Nancy and Ray De Long entering data on listener responses.

SPECIAL OF THE MONTH



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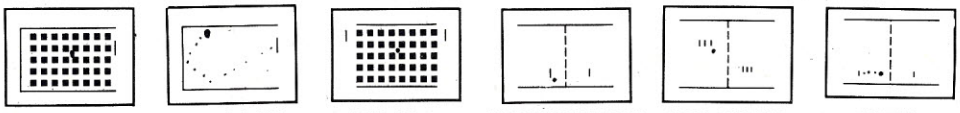

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WIPE OUT the squares — 7 serves from center — 40 squares — 10 pts each square hit by ball. On each serve square disappears when hit by ball. For 1 or 2 players.

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Also a curve button while depressed sends the ball off at a new angle.

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Controls, switches, speaker, 22 pin edge connector

VK-4 wt 1# 22.50
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To convert video signal to TV signal. Eliminates internal T.V. wire-in

VK-5-A wt 5# 17.50
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for P.C. board mounting transformer, high current Voltage Reg. capacitor heat sink

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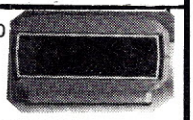
CLOCK KIT $12.95

MM5316, pc bd., display tubes switches, etc, instructions.

CLOCK CHIPS

MM5375, MM5316, MM5369
Your choice $4.95



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7423 .28	7480 .69	74144 4.00	74185 1.30
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7428 .40	7486 .25	74150 1.00	74193 .85
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7430 .20	74891.50	74153 .70	74195 .55
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7438 .28	7493 .39	74157 .70	74199 1.75
7439 .36	7494 .70	74158 1.75	74200 3.50
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7489	64 Bit R/W	2.00
74200	256 Bit R/W	5.75
	PROMS	
1702A	256x8 Eras	12.00
1702AL	256x8 low pow	12.00
8223B	32x8	3.50
74S 287N	256x4	6.95
	SHIFT REGISTERS	
MM5058	1024xl Static	4.75
TMS3002LR	Dual 50	4.00
TMS3132NC	Dual 144	3.00

	COMPARES TO
2107B4	TMS4060
2102	AMD9102, ISL7552-1, TMS4033
MM5058	AMD2533, FSC3355, TMS3133
TMS3002	SIG2509
TMS3132	MM4060, FSC3346

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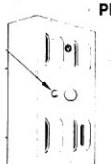

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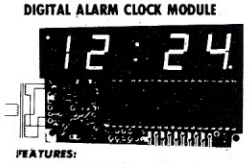

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Circle No. 7 on Inquiry Card

UPdate

The concept of the *Update* Department is broadened with this issue— it is beginning to evolve into something new.

In the past, *Update* has been concerned with announcements of coming events. and the formation of new clubs. This month it is expanded to include questions, suggestions, requests for help, brainstorms, fantasies and other information sent in by readers.

We feel that this sort of easy-access forum is one of the most important parts of *Interface,* if not the most important. We hope that you use it as you would a bulletin board and that it will foster connections between people and ideas which go on independent of *Interface.*

The definition of *Update* is not frozen. Give us feedback on the format of this forum and let us know if it needs a new name (Data Bus, Forum, Bulletin Board,??). Also, if you send in a short contribution, indicate whether you consider it a letter to the editor or an *Update* item.

Music to Your Ears

A symposium on music is being organized along the lines of the computer graphics program held last summer in conjunction with the Academy of Motion Picture Arts and Sciences. It will be an all day affair on February 19th. The program will have talks on method and technique, each illustrated with a live or taped performance. A number of prominent computer-musicians have agreed to participate; however, the program is not yet fixed.

The symposium organizer is Bill Sinclair, who is a physicist, professional musician, and computer person. Bill is working on computer enhancement of live performances. He may be reached at (213) 249-1402 or by writing Box 54751, Los Angeles, CA 90054. If you wish to order tickets, they are $4.00 each for members of SCCS, IEEE and their guests (include a SASE with your order).

Certificate in Data Processing Examination

Registration Form and Fees due December 15, 1976. Write to Institute for Certification of Computer Professionals, 304 E. 45th St., N.Y., N.Y. 10017 (212) 754-3208 for 1977 Announcement, Application forms and Study Guide.

Need Quality Hard Copy?

I am developing an adaptor for manual typewriters that will permit them to be driven by any serial data that is in ASC11 at 110 baud. Let me know what features you would like to see incorporated.

Edward J. Songy, 314 Royal Drive, Slidell, Los Angeles 70458 (504) 643-7931 (After 1900 CST)

CCD Boards

Dear Larry:

Just received a note from Seattle that you would like prices for CCD boards and progress report.

The 64K CCD Board was designed to provide Mass storage capability for the "Hobbyist Standard" 100 pin bus.

The BISI CCD system consists of three types of circuit boards:

1. A DMA (Direct Memory Access) Controller board. ($175 kit)
2. A CCD Controller Board. ($190 kit)
3. 64K byte CCD boards. ($175 kit)

Each Hobbyist computer must have one DMA board, one CCD controller board, and as many 64K byte CCD boards as needed (up to 32 Max) to give the desired storage capacity. The 64K byte board price does not include the memory chips and sockets. Each 16 chips (32K bytes) will cost another $320.

Power on 12 volts supply is 650ma MAX when CCD's are shifting and down to 200ma when just refreshing. Thus the normal Hobby supply of 2 Amps should be able to support 3 to 64K boards.

If our extensive checking (caused us to add Hamming bits for users of accurate digital work) continues at its current satisfactory rate look for Jan/77 delivery.

Will keep you posted and thanks for your interest.

J.R. Broom and Doug Denny
BISI
410 N.E. 72nd
Seattle, Wash. 98115

This may be a paper tiger (though I sure hope it isn't), but I feel the need to pass along news of a CCD memory system which is being developed for the "whatever-its-called" 100 pin bus.

Aside from having my 1950-based mind blown by things like this, I feel that it is time for us to begin speculating about how we will use large, electronic memories when they are widely available at low prices. I would like to urge readers to begin sending fantasies about software design and applications to us. If you had 2048K bytes of electronic memory on your system, how would you use it?

Editor

Up Date

Hobbyists Need an Easily Changeable Keyboard.

There are many different possible keyboard arrangements of the keys. For example, there is the conventional QWERTY typewriter keyboard which is now an ANSI standard.

As another example, there is the computer-adding machine keyboard which has numeric keys placed on the three lower rows of keys in such a way that they resemble an adding machine. This keyboard is much preferred by accountants and mathematicians who have numeric data to enter.

Also, computer control keys are sometimes good in one place, and when programming extensively, they are much more convenient in another location on the keyboard.

There is no one single ideal keyboard.

The choice of a keyboard depends on the user and his uses.

Hobbyists cannot afford many different keyboards. They can afford one keyboard. They need many. What is to be done?

We need an article on how to build a CHANGEABLE keyboard arrangement by means of a breadboard.

RADIO SHACK sells a keyboard which the purchaser wires to suit himself. Other companies do likewise. A standard ASCII encoder ROM connected to the computer, and a breadboard between the ROM and the typewriter keyboard, should provide all the flexibility that anyone would want.

How about Don Lancaster, or someone who specializes in keyboards writing such an article?

Edward L. Tottle
2993 Yorkway
Baltimore, Maryland 21222

Handy Hint: Modify Your Memory Board for Automatic Non-protect

Early versions of the 4KRA memory board from Processor Technology did not provide for automatic unprotect of memory when the computer is powered up. While this is not a problem for most computer buffs with knowledge of the inner-workings of a micro, it proved to be a serious stumbling block to my wife and children. Trying to remember which switches to set where, in order to unprotect the memory, added unnecessary complications to an otherwise simple cold start, with a PROM bootstrap for TCH cassettes. So I developed a simple modification for use with the Altair/Imsai bus.

The solution was borrowed from the new Revision D PTC boards. It uses a diode between edge connector #99, 2nd pin 4 of IC 41 (the Protect Flip-Flop). This is easily accomplished by soldering a piece of wire approximately 7 inches long to the cathode end of a small, glass-encased germanium diode. I used a 1N277, having several on hand. The opposite end of the diode (anode) is soldered to the foil running to pin 4 of IC 41 on the bottom (not the component side) of the PC board. The loose wire end is then carefully soldered to the top edge (tinned portion) of edge connector 99. Pin 99 is the 2nd pin from the end on the bottom side of the board, and at the same end as the heat sink. IC 41 is the last IC at the opposite end of the board from pin 99.

This modification takes advantage of the 8080-generated "Power-On-Clear" pulse to automatically unprotect the memory when the equipment is turned on, and has been successfully implemented on three 4KRA boards with no detectable problems.

Fred La Plante

Call for Papers and Participation

The first major convention to be held on the West Coast, exclusively concerned with personal and home computers, will take place April 15-17, 1977. The First West Coast Computer Faire will be held in the largest convention facility in Northern California, taking over the entire Civic Auditorium in San Francisco's Civic Center. It is expected to draw 7,000 to 10,000 people for the two and a half days of talks and exhibitions. The Conference portion of the Computer Faire is expected to offer 50-100 tutorials, informal presentations, formal papers, and discussion sessions. The Exposition portion of the Faire will place a variety of "homebrewed" personal computer systems on display, as well as presenting a massive exhibition of low-cost and exotic computer systems, components, and peripherals available from commercial vendors. Over 200 such commercial exhibits are expected.

Interested parties are encouraged to offer suggestions and volunteer to participate in the Computer Faire. Suggestions and volunteers concerning the following are particularly sought: Possible speakers, interesting topics, Conference Section Chairpeople, interesting homebrew exhibits (hardware or software), appropriate commercial exhibitors, possible special activities, etc. Suggestions and questions should be directed to either:

Jim Warren, Faire Chairperson
Star Route Box 111
Woodside, CA 94062
or
Bob Reiling, Operations Coordinator
193 Thompson Square
Mountain View, CA 94043

Note: Jim is Editor of *Dr. Dobb's Journal of Computer Calisthenics & Orthodontia,* and Vice Chairman of the Association for Computing Machinery's San Francisco Peninsula Chapter. Bob is Editor of the *Homebrew Computer Club Newsletter,* the publication of the second-largest organization of computer amateurs in the United States.

A considerable variety of Conference Sections are being planned. These include:

- Personal Computers for Education, which will have associated with it, a University of California short-course
- Computer Graphics on Home Computers
- Computer-driven & Computer-assisted Music Systems
- Personal Computers for the Physically Handicapped
- Computers & Amateur Radio
- Hardware, Software & Systems for Home Word Processing
- Speech Synthesis Using Home Computers
- Computers & Systems for Very Small Businesses
- Microprogrammable Microprocessors for Hobbyists
- Digital Cassette Tape Standards
- Program & Data Input via Optical Scanning of Bar Coded Information
- Peripherals Interface & Bus Standards
- Software Design, Modularization & Portability
- Floppy Disc Systems for Home Computers
- Computer Games – Alphanumeric & Graphic
- Discussion Sections for Computer Club Officers, Convention Organizers, Club Newsletter Editors, etc.

Other Conference Sections will be added as topics are proposed and speakers are found.

The Computer Faire has a broad range of sponsorship from local and regional computer and education organizations. Co-sponsors currently are:

- the two largest amateur computer organizations, the Homebrew Computer Club and the Southern California Computer Society
- both of the area Chapters of the Association for Computing Machinery, the San Francisco Peninsula Chapter, and the Golden Gate Chapter
- Stanford University's Electrical Engineering Department
- the Community Computer Center and the People's Computer Company, both being California-chartered non-profit educational organizations
- the Amateur Research Center, affiliated with the Foothill College Space Science Center
- the Professional and Technical Consultants Association

Resolutions of co-sponsorship are currently under consideration by still other local and state organizations.

Even though the prospectus for commercial exhibitors has not yet been printed, over 50 vendors have already committed to presenting their products at the Faire.

Additionally, a number of the larger companies are currently working on obtaining management approval for joining the exhibitors. Incidentally, these commercial exhibitors will be allowed to sell the products at the Faire and will, in many cases, be offering special reduced rates for those who attend the Faire.

A large number of door prizes will be given away at the Faire. Additionally, prizes will be awarded for the most outstanding home-brewed computer exhibits...just like the home cookin' prizes of the old county fairs.

Hey Authors!

Laurel Publications is currently planning production of a book tentatively titled *The Personal Computer* and we are looking for contributors for various chapters. Some of these chapters may include discussions of various systems available such as thoroughly homebrew systems, developmental boards and complete systems; how to get into and have fun with software; peripherals and their interfaces; how microcomputers work. We are looking for talented people with some writing experience, however, help with rewriting is available. Rough illustrations will be redrawn by professional draftsmen. We are looking for people with diversified interests and specialties to make a well-rounded and interesting presentation. Royalties to be divided among participants. For more information, call Joel Miller at (408) 353-3609 or write Laurel Publications, 17235 Laurel Rd., Los Gatos, CA 95030.

8080 BASIC Compiler in Public Domain

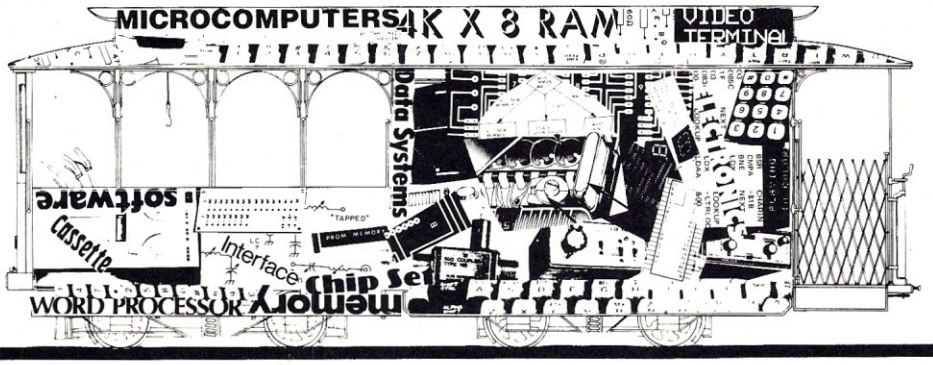
Release of the 8080 BASIC software compiler developed by Livermore Labs, Livermore, California, as announced last July in *Electronic Engineering Times,* is now a reality. The software is a stripped-down version of BASIC with a floating point package that can run as a local interpreter in approximately 5,000 memory locations. To assure that the software effectively reaches as many as possible, Livermore Labs' Design Engineer, Eugene Fisher has advised us that listings may be obtained through the Intel Users Library, National Technical Information Service, and *Dr. Dobb's Journal.*

Dr. Dobb's Journal, reports editor Jim Warren, will print the complete program listing in an early fall issue. If you don't already subscribe to *Dr. Dobb's,* we think that one issue would be well worth the price of the subscription at $10 per year. You may write them at P.O. Box 310, Menlo Park, CA 94025.

The 8080 BASIC compiler is also available through the National Technical Information Service. Contact them by writing to the attention of the U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

To become a member of the Intel User's Library, either payment of $100 for a year's membership is required, or a program must be donated. With membership, the User Library provides a complete manual of programs in the library, with updates and additions supplied during the year. For more information, write User's Library, Microcomputer Systems, Intel Corp., 3065 Bowers Ave., Santa Clara, CA 95051.

Continued to Page 33



THE FIRST WEST COAST COMPUTER FAIRE

A Conference & Exposition on Personal & Home Computers

San Francisco Bay Area—where it all started—finally gets its act together.

7,000-10,000 PEOPLE ▪ 100 CONFERENCE SESSIONS ▪ 200 COMMERCIAL & HOMEBREW EXHIBITS

2 BANQUETS ▪ SPECIAL INTEREST SOCIAL CENTERS

San Francisco Civic Auditorium, Northern California's Largest Convention Facility

YOU Can Be A Part Of It:

▪ *Some* of the things *you* can do are:

Exhibit a Homebrewed System
- Hardware or Software
- Prizes for Best "Homecooking" (just like a country fair)
- Nominal Grants-In-Aid Will Help With Exhibit Transportation Costs (grants will be refereed)

Present a Talk
- A Formal Paper
- An Informal Talk

Serve on a Panel
- As a Panel Member
- As the Coordinator/Moderator

Offer Suggestions
- Topics for Talks & Panels
- Speakers & Panel Participants
- Interesting Exhibits (homebrewed or commercial)
- Special Activities

▪ *Quick*, write or call for more details!
Jim Warren, Faire Chairperson
Box 1579
Palo Alto CA 94302
(415) 851-7664 v 323-3111

▪ *Some* of the **Conference Sections** being planned:
- Computer Graphics on Home Computers
- Computer-Driven, & Computer-Assisted Music Systems
- Speech Synthesis Using Home Computers
- Computers & Amateur Radio
- Microprogrammable Microprocessors for Hobbyists
- Program & Data Input via Optical Scanning
- Floppy Disc Systems for Personal Computers
- Computer Games: Alphanumeric & Graphic
- Computers & Systems for Very Small Businesses
- Personal Computers for the Physically Handicapped
- Personal Word-Processing Systems
- Software Design: Modularity & Portability
- Personal Computers for Education associated with a Univ. of California short-course
- Several Sections Concerning Standards
- Other Sections for Club Leaders, Editors, Organizers, etc.

▪ **Co-Sponsors** include amateur, professional, & educational groups:
- The Two Largest, Amateur Computer Organizations
  Homebrew Computer Club
  Southern California Computer Society
- Both Area Chapters of the Association for Computing Machinery
  San Francisco Peninsula Chapter & Golden Gate Chapter
- California Mathematics Council
- Stanford University's Electrical Engineering Department
- Community Computer Center
- People's Computer Company

april 15-17, 1977 • san francisco

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Circle No. 8 on Inquiry Card

APPLICATIONS EXCHANGE

by Larry Press

COORDINATORS

Secondary Schools:
Art Armstrong,
3345 Moore St.,
Los Angeles, CA 90066
(213) 397-3847

Commodity and stock price prediction:
Mary Stevens,
11745 Montana Ave., #110,
Los Angeles, CA 90049
(213) 472-1098

Programs for small children:
Joanne Verplank,
1919 Menalto Ave.,
Menlo Park, CA 94025

Statistical applications:
Barry Gerber,
Dept. of Political Science,
CSU Fullerton
Fullerton, CA 92634
(714) 993-1567

Computer graphics:
John de Longpre,
11464 Bailey Dr.,
Lowell, MI 49331
(616) 897-5822

Power supplies:
Fred Schultz,
3734 W. Slauson,
Los Angeles, CA 90043
(213) 299-4439

Medical applications:
Lou Fields,
11662 Sunset Blvd.,
Los Angeles, CA 90049
(213) 272-0942

Biofeedback:
Larry Press,
1702 Ashland,
Santa Monica, CA 90405
(213) 396-0048

Biorythms:
Art Childs,
335 N. Adams, #210,
Glendale, CA 91206
(213) 243-5179

MITS basic:
Jon Walden,
11557 Sunshine Terrace,
Studio City, CA 91604
(213) 769-6569

Electronic music:
Prentiss Knowlton,
255 N. Madison Ave.,
Pasadena, CA 91101
(213) 449-6034
Suite #4,

Voice synthesis:
D. Lloyd Rice,
821 Pacific, #4,
Santa Monica, CA 90405
(213) 392-5230 (hm),
(213) 825-2773 (bus)

Games:
George Tate,
3544 Dahlia Ave.,
Los Angeles, CA 90026
(213) 663-2604

Astrology and ESP:
Al Manning,
ESP Laboratory,
7559 Santa Monica Blvd.,
Los Angeles, CA 90046
(213) 876-9984

Mark-8 hardware, corrections, add-ons, and software:
Ronald Carlson,
14014 Panay, #255,
Marina del Rey, CA 90291

We have a whole raft of new volunteer coordinators this month, in the areas of statistics, small childrens programs for small children, power supplies, medical applications and computer graphics. I have listed all of them, but time and space only permit an introduction to two of them: Joanne Verplank and Barry Gerber. I'll introduce the other three next month.

Barry Gerber, a professor in the political science department at Cal State U, Fullerton, has volunteered to become our coordinator for statistical applications. Barry is building an Altair/Tarbell statistics package. He has the data I/O interface and a number of univariate statistics running and is adding a number of multivariate statistics. Barry plans to use the system for his own work, but also has a proposal to work with high school students – he wishes to develop a curriculum package in which social science students are given meaningful multivariate data bases and his analysis package and led through a course of data exploration and discovery.

As if that weren't enough, Barry also has an Altair/Tarbell text editor written in MITS BASIC. I have a copy and will say something about it next month.

I'm also excited about our other new coordinator, Joanne Verplank, who is interested in programs for small (grade school) children – games, educational programs, whatever. Joanne is director of the Community Computer Center (CCC) in Menlo Park, which I've written up before, so I needn't fill you in on her background. Suffice it to say that she is highly dedicated to the subject (she is a semi-pro) and has more experience with kids than anyone I know. CCC also has a facility and procedure for program reproduction and distribution.

I am also most pleased in that Joanne is not from Southern California. Why are most of our coordinators from Southern California??

Money Matters

Mary Stevens turned up two people who are using their micros to get rich quick. Michael Cerillo of Lancaster, Pennsylvania, (717) 299-5543, is using an ALTAIR to give his clients market statistics and graphs from daily data. That's all the information I have on Michael.

John Rosenstock at (503) 225-0745 in Portland, Oregon is really going to town in the area of commodities data storage and analysis. John is a commodities broker with Maduff & Co. and has an IMSAI with 8k PROM, 16k RAM, and a dual floppy, VDM, Dazzler, a modem and a DTC-300/t hard copy terminal (with graphic capability). In order to help with his personal investment decisions and to intelligently advise his clients, John accesses a data base via time-sharing daily. Rather than merely looking at the data base, he copies it onto his floppy disc, for subsequent analysis.

He has, and is continuing to expand, a library of programs for processing the data which he has stored on his disc. He is able to do statistical analysis, color graphic displays, hard copy reports and graphs, etc. John and his systems analyst/programmer/hardware expert/genius partner, Doug Crowe are "having a ball" and making money for themselves and John's clients in order to pay for their machine and time.

If you'd like to try the same sort of thing yourself, the data base which John buys is available over Call-a-Computer time sharing and is maintained by Mike Marriot of MJK Associates, 1961 Old Middlefield Road, Mountain View, Ca. 94043.

Letters to the Editor

Where's My Interface?
Dear Larry,

Early this year I joined SCCS to take advantage of their group purchase plan and to receive their excellent magazine. My magazines began with May. In August I began getting "Interface Age". Now I see in "On Line" that the official publication of SCCS will resume in November. I have the following questions:

1. Am I still a member of SCCS?
2. Will I receive Interface in November?
3. Will I continue to receive Interface Age?

Good Luck!
Frank H. Myers

Editor's reply:

Needless to say, we've received quite a few letters asking the sorts of questions Frank does—we've selected his as representative.

Yes, you are still a member of SCCS and will continue to receive Interface. We're sorry for the missed months, but it took us a long time to line up new publishing services.

As to Interface Age, you will have to ask them. Their first two issues (numbered 9 and 10) contained much of our copy and they have been mailing it to some of our members. We don't really know where they got our mailing list or how they decide which members to send it to and which to skip.

Group Purchase
Dear Larry:

I am writing with regards to obtaining an information channel on group purchases of the SCCS. I wrote to your predecessor, Art Childs and to my knowledge no action was taken. Now the SCCS is no longer a local organization and has a national following, it would be beneficial to provide some effective, inexpensive way to obtain information on the latest SCCS group purchase info. As a minimum it would help to publish in Interface although this is not a very timely way. Possibly a Wats line or designate various Computer Clubs across the country as part of a network for information on member purchases. I am not sure of the most effective way, but for the past six months I have not been able to take advantage of any offers and now I am ready to start purchasing.

Very truly yours,
R.I. Demrow #2275
11 Linda Rd.
Andover, MA 01810

Dear R.I. Demrow:

The Wats line would be too expensive, but the idea of chapters as information networks sound very good. The San Diego Chapter is already acting as a local representative for group purchase. If you could form a purchase group in your own geographical area, we could supply up to date information and ship orders for the whole group at one time.
Wayne Brady
SCCS Treasurer

A Letter to our President.
Dear Lou,

As I watched the Democratic Convention, I was impressed by the fact that there was a Delegation of Democrats Abroad. Then I opened my July Interface and read about "The 1976 Election of Officers and Directors" in your column and wondered about us "foreign" members of SCCS across the U.S. (non-Californians). Are we members or just subscribers? I sir, for one, consider myself a member just as I am also a member of the New York Amateur Computer Club and the Long Island Computer Association. Why is there no one to represent us in the council of SCCS? Surely we should have the chance to nominate and vote and at least have a person on the Board who represents our interests, whatever they may be. I don't know how to implement this idea, perhaps we could have regional councils. How about thinking on this at your council?
Sincerely,
Stanley S. Veit
Computer Mart of New York Inc.
314 Fifth Avenue
New York, N.Y. 10001
(212) 279-1048

Dear Stan,

This is an issue which concerns us very much. Are there members who would be willing to serve on regional councils as Stan suggests? Perhaps a system whereby one or more board members act as lobbyists for proposals from afar. We've had one director from Northern California, but the plane travel was too much for him. Please, readers, respond to this.
Editor

This Feels Good

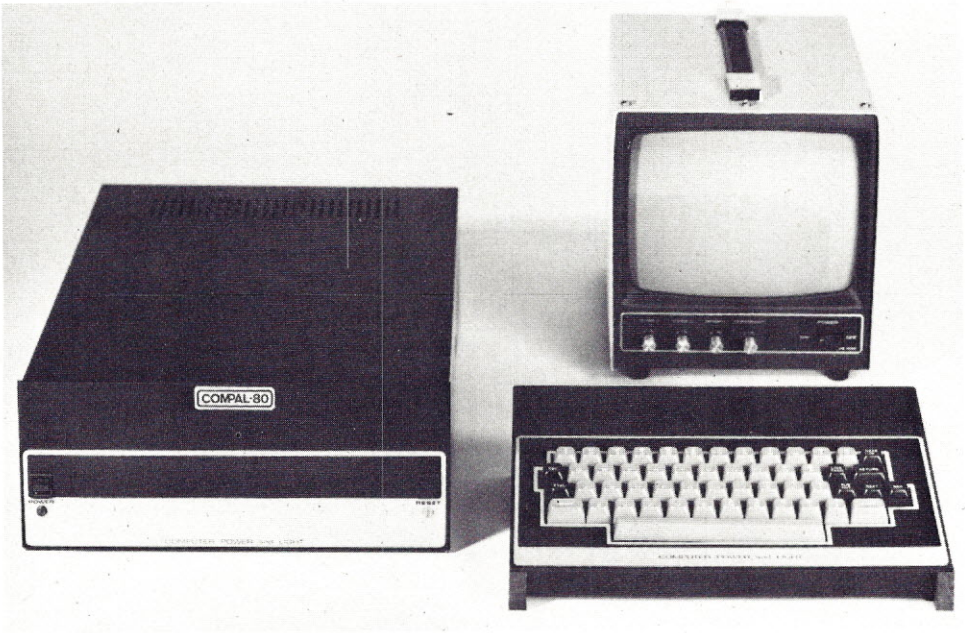
Your letter of October 18, 1976 suggests (to me at least) that the SCCS has had to spend some money to defend itself against the former publisher of Interface. I enclose a check for $50.00 to help defray whatever expenses have been incurred (could this be considered buying time on a lawyer?).

If this check is not needed for legal expenses, please use it in whatever manner the society sees fit (maybe buy a membership for a kid or something).
Thank You,
Philip C. Carlson
member #1702
4452 W. 76 St., 203
Edina, MN 55435

Dear Philip,

THANK YOU! Your letter is valuable for the much needed contribution, but even more so for the encouragement that such a gesture

SEE THE LIGHT



The COMPAL-80 computer system: $1863.00

WHAT YOU SEE IS WHAT YOU GET!
The computer, with 12K memory, input/output ports, keyboard, 9" video monitor, all enclosures, and powerful extended BASIC language — Just plug it in and you're ready to go!

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The COMPAL-80 is a complete, fully-assembled guaranteed computer that is available now. Put it to work for you on home budgets, checkbook balancing, investment profiles, mailing lists, record/book/recipe indexes, text editing, mathematical/logical skill development, word games, strategy games, sports simulations, and more . . . We have ready-made programs available,

or if you'd rather,
WE'LL SHOW YOU HOW
to write your own programs!
Anyone can write and speak eloquently in computer language after attending our series of classes which deal directly and efficiently with the art of programming.

THE COMPAL-80 IS FULLY EXPANDABLE.
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Circle No. 9 on Inquiry Card

Rickey's tackling the SDK-80 microcomputer kit for his next science project.

Rickey likes soccer, lizards, hot fudge sundaes, skateboards and microscopes. He can't decide if he'd rather be Franco Harris, Bobby Fischer or Jonas Salk.

When his Dad brought home the Intel SDK-80 microcomputer systems kit, Rickey helped him put it together. It took only four hours. Everything was there. The 8080 CPU, RAM, PROM, programmable, I/O, a printed circuit board with all those capacitors and resistors and the other things that go with it. The best part was the instruction manuals. Every step was clearly explained. It was easy. The programming part looked especially interesting. So simple. Just imagine talking to a computer.

The big thrill came on Saturday when they went to his Dad's office to use a terminal. When they connected the SDK-80 to the teletypewriter they got a printout. That was exciting. Within an hour they were talking to the computer, then inventing games. They stayed all day.

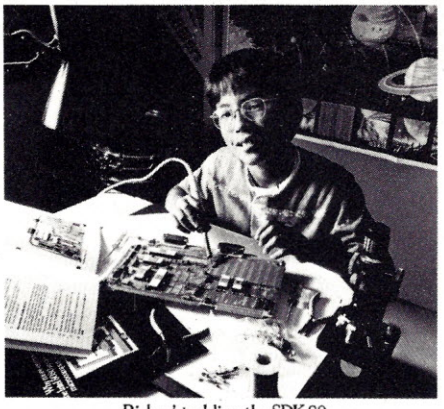
Now Rickey is building a microcomputer of his own. He may be the first kid on his block with his own computer. Thanks to a $250 low interest loan from his Dad.

If you're interested in being the first on your block to have a microcomputer, contact your local Intel distributor or neighborhood computer store. Or order by telephone and charge it to your Master Charge or BankAmericard. Phone 800-538-9373, in California call 800-672-3516.

Microcomputers.
First from the beginning. intel®

3065 Bowers Ave., Santa Clara, California 95051.

Circle No. 10 on Inquiry Card



Rickey's tackling the SDK-80 microcomputer kit for his next science project.

Now Rickey goes to the Byte Shop.

Rickey goes to the Byte Shop for advice, support, education and to expand the use of his personal computer with hardware and software.

Shopping for a computer at the Byte Shop is almost as much fun as building one.

Arizona
Tempe
813 N. Scottsdale Road
(602) 894-1129

California
Berkeley
1514 University Avenue
(415) 845-6366
Campbell
2559 S. Bascom Avenue
(408) 377-4685
Citrus Heights
6041 Greenback Lane
(916) 726-2557
Lawndale
16508 Hawthorne Blvd
(213) 371-2421
Mountain View
1063 W. El Camino Real
(415) 969-5464
Palo Alto
2227 El Camino Real
(415) 327-8080
Pasadena
496 S. Lake Avenue
(213) 684-3311
San Jose
155 Blossom Hill Road
(408) 226-8383
San Mateo
1200 W. Hillsdale Blvd
(415) 341-4200
San Rafael
509B Francisco Blvd
(415) 457-9311
Santa Barbara
4 South Mission Street
(805) 966-2638
Santa Clara
3400 El Camino Real
(408) 249-4221
Santa Cruz
1225 Ocean Street
(408) 425-1434
Tarzana
18424 Ventura Blvd
(213) 343-3919
Thousand Oaks
2705 Thousand Oaks Blvd
(805) 497-9595
Walnut Creek
2989 N. Main Street
(415) 933-6252
Westminster
14300 Beach Blvd
(714) 894-9131

Colorado
Boulder
2040 30th Street
Englewood
3464 S. Acoma Street
(303) 761-6232

Minnesota
Eagan
1434 Yankee Doodle Rd
(612) 452-1841

New York
Levittown
2721 Hempstead Tnpk
(516) 731-8116

Oregon
Portland
2033 SW 4th Street
(503) 223-3496

Pennsylvania
Bryn Mawr
1045 W. Lancaster Ave
(215) 525-7712

BYTESHOP
The affordable computer store
Circle No. 11 on Inquiry Card

provides our often sagging spirits.

Yes, our legal fees have been very high. Chip Furness jumped up at our last meeting and volunteered to organize a "legal offensive fund". Anyone who is willing to contribute can write Chip at Box 54751, Los Angeles, CA 90054.

Larry

Dear Editor:

I have put in a program called "Word Search Puzzle Generator" that I found in the July INTERFACE. I like it very much, but I found some errors in it that someone might want to know about. The first is in line 33. At the end it says "GOTO 80". It should be "GOTO 40". The second and last is in line 730, in the middle. It says "I-1", and should be "I=1".

This program is now a lot of fun. When school starts I will be in the sixth grade. I like the "Games & Things". Keep up the good work!!!

Pamela Johnson
Castro Valley, CA.

Fellow Computer Hobbyists:

I have recently become a computer fanatic like the rest of you. I am attempting to establish contact with individuals and groups that have similar interest. I have an interest in the following things:

1. The trading of computer programs. This can be handled by magnetic tape, paper tape, or letter. Letter may be faster since I can get 100 copies of my programs for less than $10.00 a set.
2. The obtaining of books, magazines, and club newsletters. I'll trade the list that I have obtained with individuals supplying similar type of information.
3. The rating of various computer components and user experience in their use.
4. Problems in constructing various computer kits and interfacing peripheral devices.
5. The establishment of a computer hobbyist register by geographical area. Thus allowing hobbyists to get into contact with one another.

Please post this letter in a prominent place. Also Xerox copies and give them to interested friends. Sincerely Yours,

William E. Blummer
1239 Chantilly Lane
Houston, Texas 77018

Dear William,
You should join a club! Join SCCS, join the Computer Hobbyist Group of North (sorry) Texas, 2377 Dalworth No. 157, Grand Prairie, Texas 75050.

Dear Editor:

I am a long time electronic hobbyist whose interest has been mainly in the field of communications.

However, the computer bug has bitten hard. As a practicing attorney, I am particularly interested in building a system which will begin by keeping time and expense records, and generating billings as well as financial records for my office. In the future this would be expanded to allow for word processing, using either floppy discs or data cassette drives, with revision capability, and perhaps telephone line access from remote points.

This is a rather ambitious project and probably will require some pretty serious information gathering, not to mention education. I would be very interested in corresponding with other attorneys or others with interest in similar applications so that we might share the learning and ultimately the software aspects of such a system.

Any assistance would be greatly appreciated.

I would like to compliment you on your publication. For years I have been accustomed to electronic publications which were primarily fat. Yours is all lean meat.

Cordially,
Gerald S. Schacter
9465 Wilshire Blvd., Suite 518
Beverly Hills, CA 90212
(213) 274-9834

Support Your Local Computer Store... If It's Supporting You

A year or two ago a computer hobbyist was willing to write a check for $500.00, send it off to a post office box somewhere in the Southwestern United States and wait 5 months for a nearly complete kit to arrive in the mail. He had loads of experience in electronics and could probably troubleshoot the kit himself when it didn't work. He didn't even seem to mind making toll calls to the Southwest if he couldn't get it to work. He was *Super Customer.*

Things have changed since then. We now have (in Bus. Ad. terms) a fledgling "channel of distribution": the computer store.

Computer stores are springing up all over the place. In addition to stocking and distributing kits and assembled products, some computer stores have taken on functions such as running classes, distributing books and magazines, writing programs for customers, maintaining machines, doing business systems analysis, and marketing computers.

We refer to the stores as a "fledgling" channel because few, if any, provide a full range of services at this time. Going further, many are undecided as to what sorts of services they wish to provide. Should they serve only the hobbyist or should they also deal with small business or the "home appliance" user who has no idea how to go into his machine. Should they offer maintenance contracts, should they "install" a business system or merely provide the hardware, should they actively make sales calls on likely customers such as school districts, should they pattern themselves after hi-fi shops, auto dealerships, IBM branch offices, Radio Shack stores or what?

The eventual answers to these questions will affect us all because the computer stores are becoming a very powerful institution in the world of hobby and personal computing. In addition to determining support services, they will influence manufacturers product offerings and, of course, prices. Will the prices of our kits go down like calculators or stay up? We have the feeling that the stores will play a significant role in answering that question.

We should also be cognizant of the fact that the stores are involved in marketing as well as distribution, and be sensitive to the danger of inordinate resources being spent on "hyping", on irresponsibly creating demand. This would seem particularly likely in the case of the relatively naive home appliance user who is predicted to be coming into the market.

Since the stores are a powerful part of our "movement" (or whatever it is), Interface is interested in reporting on them. This month we will take a look at the world's first computer store which Dick and Lois Heiser opened in Los Angeles way back in 1975. Lois and Dick have since moved to Santa Monica and are offering a progressively wider range of services. We also have an interview with Paul Terrell, the founder of Byte Inc., the first chain of independent computer stores. Paul has 31 stores as of this writing and plans to have several hundred within two years. He is also consulting to manufacturers and offering a few products of his own, so we should listen to his plans and *give him and the others feedback.*

The latest entry in the field is the Computer Shack chain, which is a full-blown franchise operation, unlike the Byte Shops which are more like a buying cooperative. Computer Shack is the newcomer, and as yet unknown; however, they certainly seem to be interested in support as well as hardware sales.

A final note is needed on the slogan-title of this article. We first used it in an illustration in the Peoples Computer Company newspaper. Those interested in computer store watching should keep an eye on PCC (Box 310, Menlo Park, CA 94025), which maintains and publishes lists of computer stores throughout the country in each issue.

The Very First Computer Store

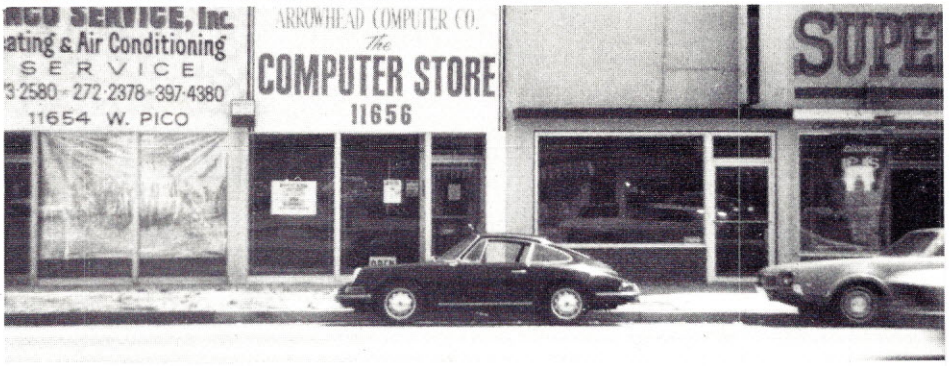
Dick and Lois Heiser opened the world's first computer store. They had both been systems analysts, Dick at IBM, Douglas, RAND, Pertec and Litton and Lois at RAND and Philco. Dick says that he knew it was early but he wanted to be there when IT happened. Since July of 1975, a lot has happened, but Dick feels that the big revolution is yet to come. Meanwhile, there is plenty going on right now and he doesn't want to wait for the future to participate in building and enjoying personal computers.

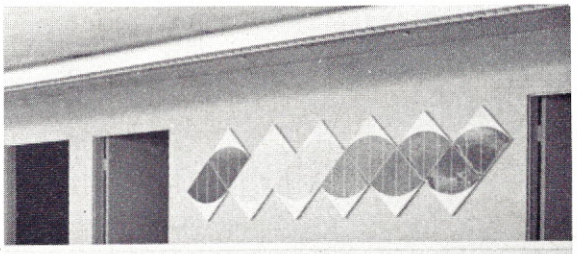
We also spoke to Mike Eusey who works at the Computer Store. He was their first employee and had built his own Altair before he started working there. He told us what the store is like with enthusiasm and affection. At first they only carried the MITS main frame, single I/O port and memory, plus TV typewriters and audio cassette interfaces. They used and recommended the teletype as the best terminal for hard copy, but did not carry them.

The staff of the Computer Store are people who love the product themselves and are here for that reason. They are qualified to deal with the "state of the art" and feel a need for the freaky dedication that moves the technology and expansion of human consciousness along. People come to the store to explore. Computers are still very expensive and the customer here is a connoisseur with a specific interest or application. The staff becomes familiar with their customers' interests and objectives and gives personal assistance.

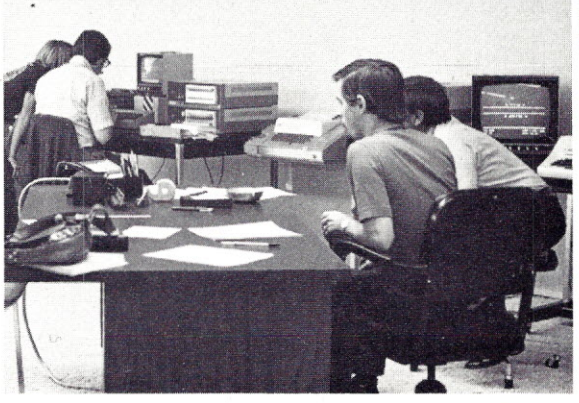
The person with an application who is not interested in computing for itself, like the business man wanting a finished package, needs a system, not just hardware. The Computer Store sells only hardware. Software and applications planning are critical ingredients in successful business applications. The Heisers feel that many new entrepreneurs will be needed to do this "system" function and encourage talented computer people to try their hands.

Dick and Lois Heiser opened the world's first computer store in July, 1975.



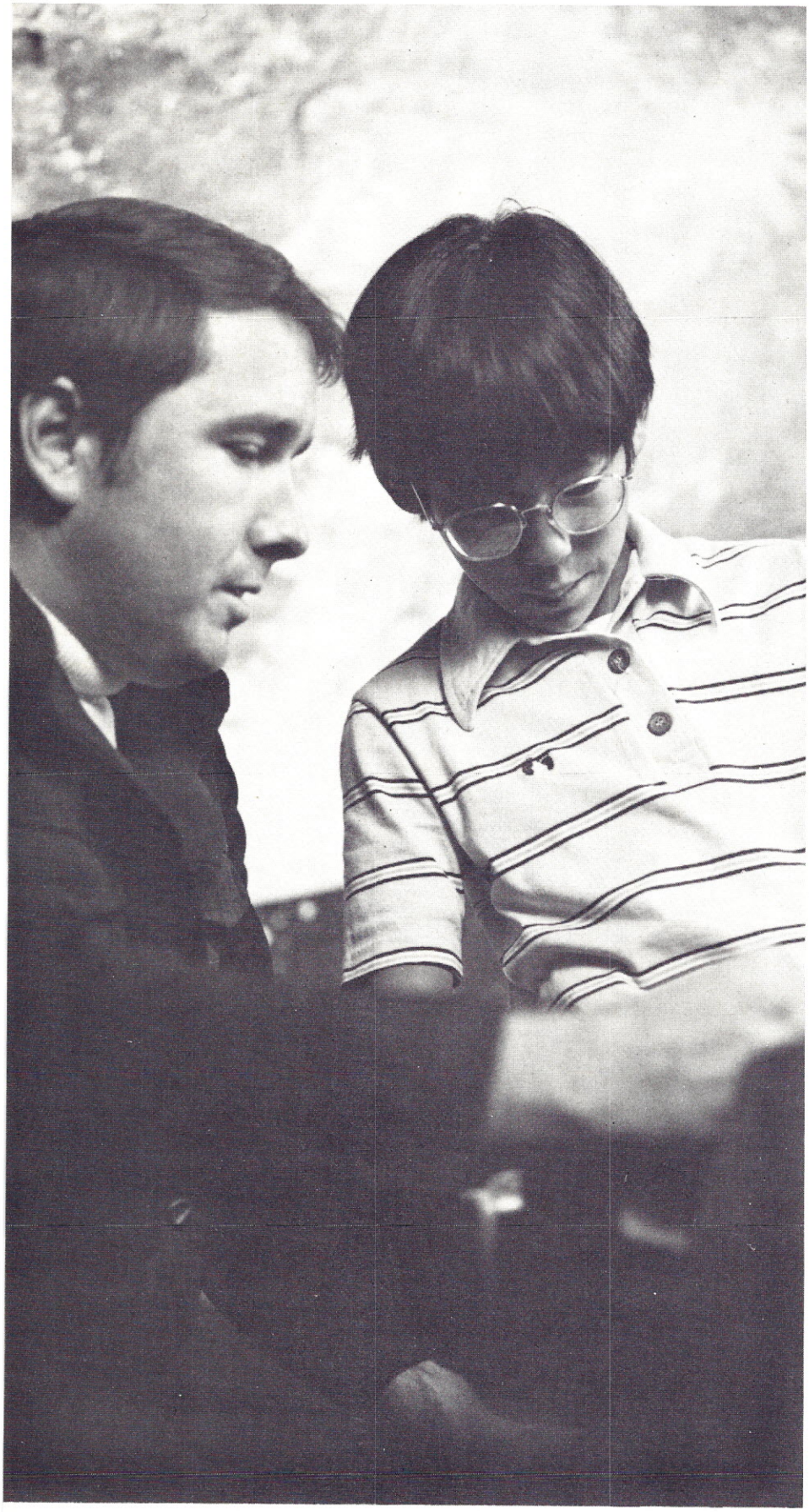


In May, 1976, they moved to a larger space in Santa Monica.



People come to explore the overall concept of data processing. One of the best ways to do it is by game playing.

The Byte Shops An interview with Paul Terrell



Paul Terrell and Rickey Kawaguchi

A note on the format of this interview is in order. We had a long, informal chat with Paul, during which we asked a number of questions and took notes on his responses. The statements below are not transcriptions of Paul's replies, but our paraphrases of them.

Q.What was your professional background, before you began the Byte Shops?

Paul's background is in electronics. He was a technician in the Air Force, with IBM and NASA before becoming national service manager for Tri Data, a manufacturer of mini computer tape drives. He then joined a turnkey systems house in Connecticut, which went bankrupt. His last duty was selling off their PDP-8 minis, which is how he discovered that he liked to sell. He came to California and became a manufacturers representative in early 1975. He began to represent MITS in the Northwest, and when he noticed that he was getting more orders on personal checks than company PO's, he decided to open a retail store. The first Byte Shop was opened on December 8, 1975.

Q.Are you a computer hobbyist yourself?

Paul is a businessman, not a hobbyist. He has a "dusty" PDP-8 left over from his company in Connecticut, but has no time for it.

Q.What sort of people are opening Byte Shops?

At first it was engineers and programmers, ("a guy would buy a computer one day and a store the next"), but since they were written up in *Business Week*, it has been primarily business people. Paul now feels that business skills are more important than technical skills to a Byte Shop owner. People who open Byte Shops get an exclusive geographic territory which is theirs as long as they meet certain minimum gross sales objectives.

There have been over 1,000 applicants for Byte Shop franchises. People often want rights to entire states or even countries, but are limited to areas which might reasonably support 4 stores. The cost of opening a Byte Shop is about $20,000.

Q.Who staffs the Byte Shops? Who would I typically deal with?

The owner is typically in the store part-time and is busy with business considerations. The typical "counter" man is a student or computer "freak" who is a technical whiz and avid hobbyist himself. He makes about $3.00 per hour and gets to play with all the equipment.

Q.Do you feel that you are unfairly exploiting your highly skilled help at $3.00 per hour?

It is a fair wage because the employees have access to all sorts of equipment, and they are typically young, single college students. This is more than Radio Shack pays their people and many people are willing to work in a Byte Shop at this rate.

Q.How many Byte Shops are there, and how are they different from other stores?

There are 17 now and should be 30 by November 1. By the end of next year, Paul expects to have 200 stores ("Radio Shack opens 2 stores every day").

Byte Shops will carry products from any manufacturer and the shop owner can slant his business as he sees fit – to the hobbyist, the small business, the "black-box" personal computerist, etc. They will combine the flexibility of an independent dealer with the buying power, collective advertising, etc. of a chain. Paul began as a MITS dealer, but left them when they balked at his selling IMSAI, SWTP, Apple and other CPUs.

Q.How will small business data processing systems be designed and installed? Can a Byte Shop act as an "IBM branch office?

Byte Shops cannot afford the sort of in house staff necessary to sell, design, program, install and service a small business account. They will rely on general purpose software, which can be demonstrated at the store, and a file of names of good local consultants, programmers and maintenance people to recommend to their customers.

Custom software is too expensive – they will only sell "vanilla", if a user needs other flavors, he will have to develop it himself.

A lot of generalized packages will be adapted from the BASIC language program libraries of the current mini-computers. Hardware maintenance will eventually be supplied by the large, third party maintenance firms like Raytheon.

Q.How will software come to be distributed?

Paul feels that the answer to the software ripoff problem is cheap, mass distribution. If a package is cheap, the user will pay the price in order to get documentation, to be on the mailing list for updates, and to keep his karma in tact.

He feels that shops can distribute software more effectively than mail order operations because of the availability of local people to assist the user and because the programmer who writes the software can have a person-to-person relationship with the vendor. The same is true of clubs. Perhaps there is a place for software "agents" who would represent programmers like literary agents do.

Paul expects that the finest, most creative software will be developed by customers. Right now, about 15% of the "customers" coming into a Byte Shop are trying to sell a software or hardware package for distribution.

Q.Is Byte Inc. interested in manufacturing products?

They are only interested in specific plug-ins for "S-100" machines – products which are not available from CPU manufacturers or which are over priced. They now offer a board set – CPU, memory, and I/O. They will throw in an 8080 with the $29 CPU board ("give them the razor and sell blades – like Gillette").

Future products will include a $1500 line printer and an interface to the Shugart mini-floppy disk drive (109 k bytes at single density on one side of the media). This interface plus the drive is estimated at $10 – 1200.

They are primarily a retailing outfit, however, manufacturing is a side line to fill gaps.

Q.What major trends do you see in your business?

Today the typical customer is either a sophisticated hobbyist or business user. He is technically competent. Next years' customer will not be technically sophisticated – he will buy a personal computing appliance and run canned programs or write his own in BASIC.

The machine he buys will be complete and assembled: 16 k memory with BASIC and a monitor in ROM and have CRT and cassette interfaces. The front panel will have only an on-off switch and a reset button. As Paul says, Radio Shack will be able to put it in a plastic "blister pack" and hang it on a peg board.

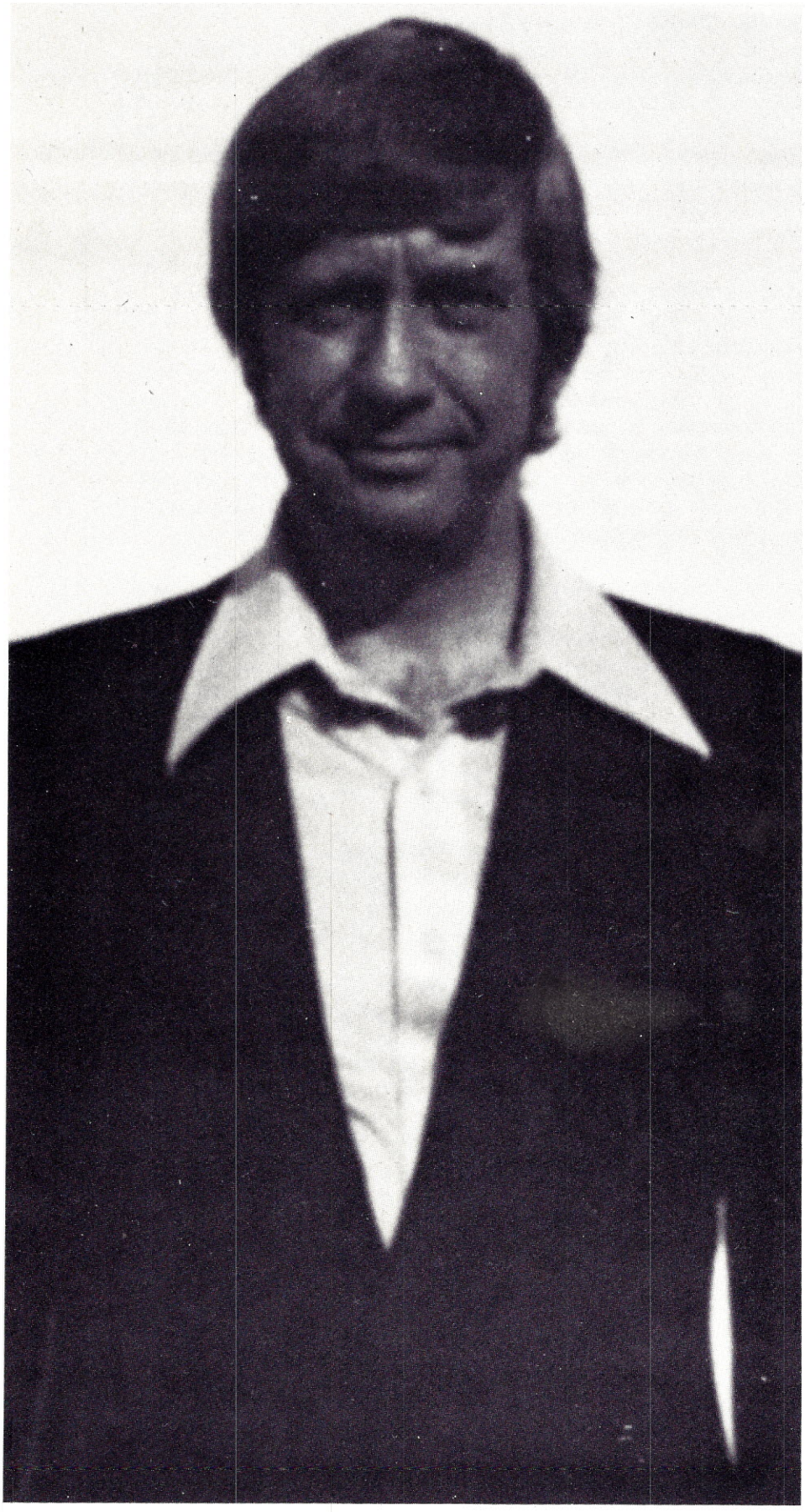
He projects a price of about $650.00 for this machine by next year. He feels it will be cheap because a number of very large companies will be in the field shortly.

Watch Out McDonalds

In the introduction to these articles, we spoke of the necessity of a computer store offering a range of services, above and beyond the selling of hardware. The people who are organizing the Computer Shack franchise chain seem to be determined to serve.

The People

First, who are the people involved? In preparing this article, we spoke to three men: Ed Faber, the president of Computer Shack, John Martin their director of Franchise Sales and Aaron Rothenberg, a franchising consultant. Faber has an impressive background in the computing field. He was with IBM from 1957 to 1969 and was in a variety of marketing and management positions in the US and Europe. Since 1969, he has been director of marketing for the Memorex equipment group, Four Phase Systems, Omron Corporation and IMS. Eight weeks ago, he became president of Computer Shack. Martin has been in franchising for six years,



Ed Faber, president of Computer Shack

but is not a computer person. He got into micros first as a consultant to a large computer store in the east then as a consultant to Computer Shack. Rothenberg is also a franchising consultant, and helped to define the program as a consultant to Computer Shack.

The watchful reader will have noted that Ed Faber was with IMS only eight weeks ago; and, in fact, a reorganization of IMS has occurred. They have become two separate corporations: Computer Shack Inc. and IMSAI Manufacturing Corporation. IMSAI will engineer and manufacture products and Computer Shack will handle all domestic sales of those products (to distributors and OEMS) as well as operate the franchise chain.

IMSAI and Computer Shack are of course good friends. They currently share facilities and have common principals, but they are independent corporations. Computer Shack stores will not be exclusive IMSAI dealers. They will carry viable products from any manufacturer, and will only feature IMSAI as long as they are competitive. IMSAI has no financial interest in Computer Shack.

Service

Computer Shack will stress service in their stores, not hardware – service to hobbyists, small businesses and educators. This stress on service (the lower 90% of the "iceberg") is reminiscent of IBM and perhaps reflects Faber's time there.

The services will include maintenance, classes and seminars, system analysis and programming assistance, and support of club activities.

We pointed out that providing all that service, particularly if they plan to carry diverse equipment, would require a large staff. Furthermore, we wondered if they weren't underestimating the difficulty of designing, programming and installing a business data processing system.

They answered that they felt that such services could reasonably be provided by the local store if they had ongoing training, documentation and consultation from a highly qualified headquarters staff. Furthermore, they are counting on a good deal of applications software being developed by entrepreneurs for distribution through their chain.

They do not have current plans for developing their own software, but will count on people coming to them with finished products. Similarly, they have no plans for developing hardware, but can foresee the day when they will affix their private brand name to products, as Radio Shack does with "Realistic".

Finally they envision their service to education in the short run to be in the support of hardware training. They will carry various trainers and breadboard systems, with applications such as CAI waiting for outside software development.

The Stores

What will a Computer Shack store feel like – like any other Computer Shack store. The plan is for uniformity of decor, product, service and layout in each store. Every store will have a game room as well as a sales area. Each will have identical signs, wall panels and fixtures. They will carry the same stock, including books, small tools and components.

This may sound like a turn-off to some, like planned mediocracy; but the Computer Shack people feel that it will result in uniformly high quality. For example, interior design has been done by a professional architect, product selection and evaluation can be done by a full time staff who monitor and test new offerings, and financial systems will be designed by accounting professionals.

Business Opportunity

In talking to the Computer Shack people, we got the impression that they felt that their viability was dependent upon two overall goals: to serve the customer and to provide meaningful business opportunities to franchisees.

The latter of course involves profit, but the notion of a "nurturing" relationship recurred throughout our conversation. It is a vague, suggestive term and hard to pin down. It involves satisfaction and a sense of participation in something significant.

Of course, a franchisee gets more than a feeling of belonging. Computer Shack, like other professional franchise operations, will provide training, accounting systems, site selection assistance, management consultation, fixtures, a guaranteed territory, publicity and public relations, national advertising (specials of the month), etc.

The most significant benefits will be technical services provided by headquarters staff and significant, high quantity discounts, which will be passed on to the franchisee.

Needless to say, the franchisee must pay for these benefits. There will be a royalty on gross sales as well as a significant franchising fee to begin with; however, large discounts are expected to cover these costs.

Where are They

Eight weeks ago, Computer Shack was an idea. Today, it is twenty people and a 3500 square foot pilot store and training facility has opened in Hayward, California. They have begun making commitments to franchisees, and are presently in the process of registering as a franchisor with the State of California. Right now, they are overwhelmed with work and inquiries. Two hundred stores by the end of 1977 seems plausible with a long range goal of one thousand. The constraints are purely logistical.

Computer Shack has lofty goals in terms of growth and in terms of serving customers and franchisees. If they do serve us, they should succeed.

Floppy Disk Operating System

By Art Childs
SCCS charter member

Many manufacturers make floppy disk drives and a few now have hardware to interface them to the ALTAIR bus; however, that is only a start. To be useful, you need a debugged, well documented disc operating system (DOS). This article describes the iCOM operating system, FDOS-II. We present it, not as the ultimate, but as an example to indicate the sorts of functions which must be provided. *Interface* would welcome comparisons and descriptions of other manufacturers' operating systems or a well thought out specification of what a floppy DOS *should* look like.

Art Childs, the author of this article, is an employee of iCOM, and the designer and programmer of FDOS-II.

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The Software

The best computer in the world is useless without programming. A mass storage device is also useless without some pre-programmed intelligence to drive it. In the case of the Frugal Floppy, manufactured by iCOM, Inc., Canoga Park, CA, the intelligence (FDOS-II) resides partially in hardware, partially in firmware and partially in software.

From the viewpoint of a programmer, the Frugal looks almost too easy to believe. When a person stops to consider that on the surface of the diskette there are 77 tracks, each of which are divided into 26 sectors of 128 bytes and that typically there may be 20 to 30 programs stored on each floppy, he realizes that it can be a bit of a problem keeping track of where everything resides. Were the programmer to handle the entire problem himself, about 50% of each program would be dedicated to deciding which track, sector and byte is holding his next piece of data, and about 50% of his CPU time would be dedicated to loading the head, verifying that the right track was accessed, finding the right sector on that track and picking up the desired byte out of the 128 available from a simple read operation. This doesn't even take into account error checking. Fortunately, with a little help from the Frugal Floppy system, the programmer can turn 99% of his attention to the application, confident that the overhead is taken care of.

driver which normally resides in PROM or ROM, and the operating system which resides in RAM when being used. The driver consists of the software necessary to perform the basic disk read, write and control operations, as well as a program to load the operating system into memory for execution. To accomplish these tasks, the driver contains routines which may be called by applications programs for the purpose of controlling disk operations. These routines are primarily the disk read, disk write and re-booting of the operating system at the end of the user program.

The Operating System

Three measures of worth of any piece of software are: ease of use, memory requirements, and degree of fulfillment of purpose. Let's take a look at iCOM's FDOS-II from these three points of view.

Operating systems come in all sizes. Many small specialized operating systems for microcomputers (often called monitors) reside in less than one kilo-byte. Many operating systems for large computers require 40K or 50K memory—many of which are so large for the machine that often only part resides in memory, with the rest residing on disk and called in only when needed, thus slowing execution. iCOM's FDOS-II occupies approximately 4K of memory and requires another 4K for buffer space, the majority of which is used for only a few functions. One of the advantages to this operating system, particularly for the budget conscious, is that 8K of RAM is all that is necessary (assuming the user programs will execute properly in 8K of RAM). In other words, no additional RAM need be purchased for the operating system.

To accomplish a disk read or disk write, the applications program merely sets up pointers in lower RAM which tell the driver where the desired data resides (or is to be written) and calls the appropriate routine. Calling the read routine results in control being returned to the calling routine with one byte of data from the disk in the A register. For the next byte, the routine is called again, etc. until end-of-file is encountered. After the initial setup, the pointers are automatically handled by the driver, leaving the applications program free of disk overhead code. The same is true for the write routine, except that the data to be written is handed, one byte at a time, to the resident driver via the C register (A-register in the 6800 version). The result is to render use of the diskette by applications programs a relatively simple matter.

Software Development System

FDOS-II was designed with software development for microcomputers—on microcomputers—in mind. To help the user accomplish his software development task, the following commands were built into the repertoire.

CHGAT (change attribute).

One of the datum carried in the file directory is file attribute. Normally, the attribute will be one of two values: 01 or 00. 01 designates a permanent file. Such a file cannot be deleted without first changing the attribute to 00, thus ensuring that the user will not inadvertently delete a file which he wishes to retain. The format is: CHGAT, FILENAME, NEW ATTRIBUTE

EXAMPLE: CHGAT, BASIC, 1

Copy

Most of us who are engaged in software development, whether on the job or at home, at one time or another have destroyed all or part of the data on a disk pack or diskette. It's a sickening feeling that accompanies the realization that many hours (often days) of work have been destroyed in a few microseconds. By the same token, it's a rather smug smile that accompanies the knowledge that the backup diskette is sitting in the file for just such emergencies. The COPY command was designed to allow the user to avoid the trauma of re-entering that 726 line source file. The COPY command will cause the diskette in drive 0 to be copied, sector for sector, onto the diskette in Drive 1, a task accomplished in approximately 1½ minutes.

Creat

At first glance, this command seems to perform an almost useless function. Invoking this directive causes space to be reserved on the diskette, and the accompanying information entered in the file directory. In short, it creates an empty file, but does so without altering what data may exist in the space allocated. It is this feature that makes the command useful in emergencies. For example, suppose a diskette with several files existed before a bug in a program being tested caused the directory to be destroyed. The directory list before the accident would have appeared as:

NAME	ATTR	TRAK	SCTR	SIZE
EXEC	01	05	01	0057
EDIT	01	08	0A	0036
TEST	01	0A	0C	0001
DIAGO	01	0A	0D	001C
ASMB	01	0B	0F	008E
TRACE	00	11	01	0034
DTEST	00	13	01	0004
PMON6	00	13	05	0042
TSTS	00	15	13	0045
TSTS1	00	18	0A	0048

Chances are the first five files, being a standard part of the development software will exist on other system diskettes. Those files can be recovered in other ways. The real concern is the remaining files.

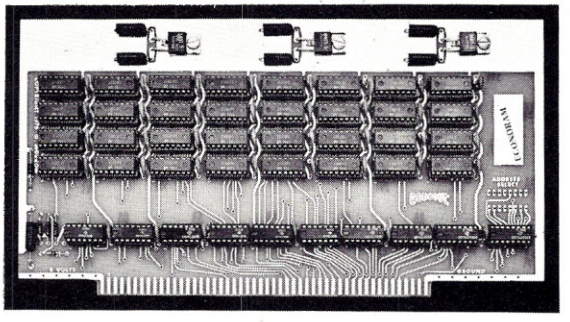
If a hard copy on the directory list is

"IF YOU COULD HAVE ANYTHING YOU WANTED IN A 4K×8 MEMORY BOARD KIT, WHAT WOULD YOU WANT?"

"I'd want it to be plug-in compatible with my Altair 8800 or IMSAI, have zero wait states guaranteed over the full temp range of 0° to 55°C, and current drain of no more than .75A; .6A is more like it. And I'd like buffers on the addresses, data lines, and outputs... enough regulators to give some headroom for my supply, lots of bypass caps, and the latest low power Schottky support ICs. And I want sockets for all ICs, a really nice PC board, some decent instructions... and a warranty against defective parts. Oh yes, and I'd like all this for under $100."

ECONORAM T.M.

$99.95



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available, the solution to the problem is rather simple: (1) Add the size of all files preceding the file to be recoverd, (57 + 36 + 1 +1C + 8E = 138) (2) Calculate the number of sectors in the preceding system area (3 tracks at 26 sectors each equal 4E) (3) Using the INIT command, initialize the directory on the diskette. This puts the diskette in user format (no systems software area) utilizing the first track for the directory. (4) Using the CREAT command create a file X 176 (hex) in size (CREAT, X, 176). (5) Next create the file to be recovered (CREAT, TRACE, 34; GREAT, DTEST, 4; etc.). The files may then be accessed in a normal fashion.

If a listing of the directory as it existed before the disaster does not exist, the problem is a bit more difficult. Using the CREAT command (after the INIT command) generate one directory entry making the entire diskette one file. Then, using the text editor, edit onto another diskette the data from the original file(s)—a simple matter, if the files contained source code—a bit more difficult if they contained object code.

Delet

All files on a diskette are contiguous. When a file, for example the file named TRACE in Fig. 1, is deleted, all succeeding files are moved down (toward the perimeter of the diskette) utilizing the space previously occupied by the file TRACE. This creates unused space beginning on track 16. The moving of these files (the packing function) occurs automatically when any file is deleted. This philosophy of storage area management enables the use of a less complicated operating system—one of the reasons for the reliability of the FDOS-II software.

Dump

The dump command merely causes the contents of the specified file to be dumped to the punch device. This directive is most often used for creating punched paper object tapes after the assembly function has been performed.

Int and Xgen

Two different formats of diskettes are generated by FDOS-II. The first, and essential format is the system diskette. This type of format is generated on a blank diskette using the XGEN command which reads the executive object code from either punched paper tape or from another diskette, storing the object code on tracks 1 thru 3 of the diskette in drive 0. Upon completion of that task an empty directory is installed on track 0. The executive is transparent (doesn't appear in the directory) and is the code used to boot the operating system into memory.

The other format—User Format—consists of only a directory located on the first track. To generate this format, the command INIT, U (U=drive number) is utilized.

List and Print

The functions of LIST and PRINT are sometimes confused. LIST,U causes the contents of the directory on the floppy in the drive specified to print on the list device. PRINT, FILENAME:U causes the contents of the file specified, on the floppy in the drive specified, to be printed on the list device (if the drive is not specified, it defaults to drive 0). Such is the case with all FDOS-II commands.)

Load

To load data from the paper tape reader onto a file simply type LOAD, FILENAME. The system will create a new file of whatever size necessary to hold the data input, update the directory with the file information and return control to the command function.

A comment on object file format is appropriate at this point because of the end of file convention used in FDOS-II. As in most microcomputer operating systems, the hex value 1A is recognized as the termination of any file. This allows the system to perceive the termination of a file on a multiple file tape—but, it makes it impossible to load a binary formatted file without altering the operating system code. Although this may seem to be a limitation, one has to consider the fact that very few (if any) well designed software systems consider binary formatted object code to be a viable alternative. As hobbyists become more knowledgeable about their avocation, the binary formatted file will probably become obsolete.

Merge

The MERGE command actually serves two functions. The first, as the name implies, is to merge onto a single new file, two or more existing files—a useful command when building a new program from parts of existing programs. The second function of the MERGE command is the transfer of data from an existing file to a new file on either the same drive or a different drive.

Exit

As the command implies, the operating system is exited and control transferred to the monitor.

Renam

If for whatever the reason, the name of an existing file needs to be changed, typing RENAM, OLD-FILE-NAME, NEW-FILE-NAME will cause such to occur. The name is simply changed in the directory.

Run

The two remaining commands are the RUN and RUNGO directive. RUN is entered as: RUN, FILE-NAME. The operating system assumes the specified file is a hex formatted object file, and will read that file, convert it to binary, and load it into memory for execution. As with the RUNGO command, the specified file (program) may overlay FDOS with no ill effects. There is, however, one restriction. Because the information about the file being loaded—the data used by the resident during the load process—is stored between 10 and 20 hex in the RAM program being loaded must avoid that segment of memory. This can create problems with programs such as MITS BASIC

which loads beginning at address 0. Two solutions to this problem are possible.

1. Assemble the program in such a manner as to begin above location 20H and with an initialization routine to restore the code that resides below 20H- or

2. Alter the load address to load from 20H and in the initialization routine simply move the program down to the proper location. Generally the first alternative will be the easiest to implement.

At the completion of the RUN command function, control is given to the monitor leaving execution in the hands of the operator. Using this command rather than RUNGO (which may be used without specifying the I/O files if desired) allows the programmer to make machine language patches in memory, or set up data and registers through the monitor prior to execution.

Rungo

RUNGO is used to execute a program residing on the diskette in object format which requires an input and/or output file. The format is:

RUNGO, PROGRAM-FILE,
INPUT-FILE, OUTPUT-FILE,
PASS-NUMBER

Both the program file and the input file must reside on a diskette but neither the input file or the output file, or the pass number need be specified. For example: RUNGO, OUTPUT-FILE or RUNGO,,,PASS-NUMBER The pass number is stored by the operating system in lower RAM for use by the applications program. The input and output pointers and counters are stored in lower RAM also, prior to loading and executing the program, enabling the applications program to read and write files on the diskette. This is accomplished by merely calling the appropriate routine in the resident driver. If desired, the output file may be closed and the operating system re-booted by terminating the applications program with a jump to appropriate entry point in the resident.

ASMB and EDIT

Some versions of FDOS-II have two additional commands. Both accomplish their tasks much the same way the RUNGO function performs, but each is designed for a special program. ASMB loads and executes the assembler after setting up the input file, output file and the pass number. EDIT does the same for the editor. Both the assembler and editor supplied with those versions of FDOS-II that contain them terminate with a jump to UPDATE in the resident which closes the output files, then reloads and executes the executive. Should your version of FDOS-II be one without the assembler and editor, you may use the RUNGO command to execute your own. Some modifications to your assembler and editor will probably be required for proper execution.

1. Change the data input from

74150 IN CERAMIC DIP HOUSE NUMBER
$1.00 (1) 75c (10) 60c (100) 45c (1000)

74181 IN CERAMIC DIP HOUSE NUMBER
$1.25 (1) $1.00 (10) 70c (100) 50c (1000)

74190 PRIME NATIONAL PARTS
90c (1) 80c (10) 70c (100) 60c (1000)

AMS 6002 CERAMIC DYNAMIC RAM 1Kx1
$1.00 (1) 70c (10) 50c (100) 35c (1K)

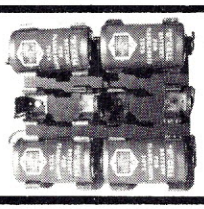
DB25's (S) $3.00 (P) $2.00 SHELLS $1.00
IMSAI 100 PIN CONNECTORS $5.00 ea.
DIP SW's 8 POSN $2.50 7 POSN $2.25

20K SLIDE POTS (STACKPOLE 114)
50c (1) 40c (10) 35c (100)

HPROM 1024 BY HARRIS SEMICONDUCTOR
256X4 FIELD PROGRAMMABLE ROM
THESE HAVE BEEN PROGRAMMED BUT MAY
HAVE HEAVY VIRGIN AREAS
25c EACH (1-1000) 15c EACH (1000 UP)

TELETYPES

- KSR 33 $450
- KSR 35's FROM $400 TO $900.
- ASR 35's FROM $700 TO $1000.



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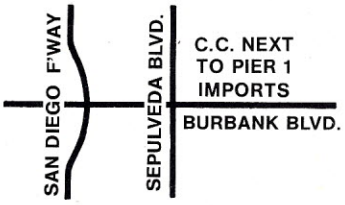

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Circle No. 13 on Inquiry Card

paper tape reader to the floppy input (RIX in the resident)

2. Change the output from punch device to floppy output (WRT in the resident).

3. Alter the assembler to obtain the pass number from the routine PASSV in the resident.

Diagnostic

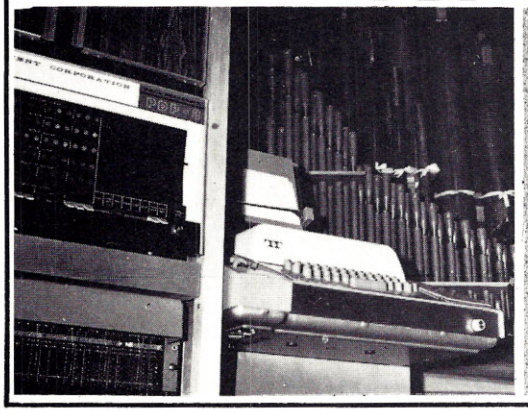
A separate program supplied with the FDOS-II software is a disk hardware diagnostic program—something we need to see more of in the hobby computing field. Using this program, which can be loaded from paper tape as well as diskette, the user can check all operations of the floppy disk hardware: read and write of any sector, head positioning to any track, and "deleted data mark" recognition.

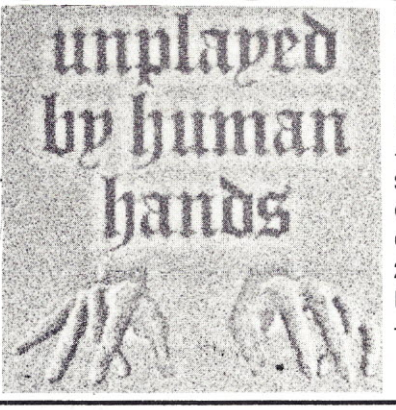
Conclusion

Floppy disk systems have, in the past, been a bit expensive for most hobbyists. For the home computerist, or professional, who is serious about software development, they are a must. The time saved using floppy as opposed to paper tape will compensate for the price of the floppy in short order.

The iCOM FRUGAL FLOPPY with FDOS-II, having been used (and hence proven) in industry for two years, and now within the reach of many personal computing budgets, appears to be one of the best ways available to implement the floppy alternative. Besides reliable hardware, the accompanying software (FDOS-II) is available and proven, making the FRUGAL FLOPPY with FDOS-II a good software development tool.

PDP-8 PLAYS BACH





The PDP-8 computer plays works by Bach, Mozart and others on the 90-rank Schlicker pipe organ at All Saints Church, Pasadena, California

Send $6.98 (plus 6% sales tax for California residents) to:
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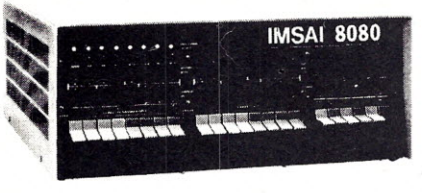

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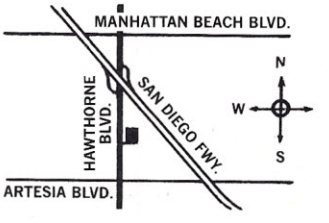

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Circle No. 15 on Inquiry Card

Tiny Assembler?

The following is reprinted with permission from Jim Haynes' column in the September issue of Computer Magazine:

A topic which can perhaps stand a little repetition, or re-emphasis with particular attention to microcomputers, is Harry Huskey's Polish Assembler, which was written up in *IEEE Transactions on Computers*, Vol. C-22, No. 1, November 1973, pp. 1035-1040. The idea is that for a small machine it is advantageous to have a very compact assembler and a very compact assembly language, so that you don't spend hours reading the assembler or its input when all you have is paper tape at 10 characters per second. The input language looks more like Chinese than Polish at first reading; but it's very easy once you get the hang of it. The basic concept is that you use single characters to represent the machine instructions and some of the assembler pseudo operations. For example. Suppose Variable Names are ordinary character strings:

Load the Accumulator is represented by '

Add Memory to Accumulator is represented by +

Unconditional Branch is represented by .

Branch is Equal is represented by =

The pseudo-operation of placing a label is represented by :

A piece of program then might be:

COUNT'L:M=1+L.

In more familiar and verbose terms this would be expressed as:

```
LAC COUNT   ;Load accumulator with COUNT
L: BEQ M    ;Branch to M if it's zero
ADD #1      ;Add literal 1 to accumulator
BR L        ;Branch back to L
```

The assembler is called "Polish" simply because the way of writing the code, operand-operator pairs, resembles Polish suffix notation (which it really isn't). For that matter, it somewhat resembles APL in its compactness. Who's going to be first with a one-page Basic compiler?

*Photocopies available at $1 each (prepaid) from the IEEE Computer Society Publications Office.
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Continued to Page 55

What a Bargain!

		Catalog #	Price*
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Circle No. 17 on Inquiry Card

Helpful Hints, or What I Had To Learn To Build a Computer

We have a hunch that the world is full of "software types" such as programmers, systems analysts, computer salesmen and even interested laymen, who would like to build or buy a computer; but are a bit afraid of the hardware. Tricia Wood has been there. Two years later, with a lot of research, hard work and help from her friends, she has a homebrew computer on the air. Tricia is preparing a series of articles to help others cover this ground more easily. If you've been reluctant to get a computer or if you are curious to know what is going on inside of your ALTAIR, but not exactly sure what to ask, you will be interested in following Tricia's column.

I became interested in electronics about two years ago. At that time I didn't know the difference between an ohm and a volt. With the help of a good friend and some books, I have learned enough to build and maintain my own computer system, an 8008 based Mark-8. Before starting my system, I built a digital clock as a "beginning project" in order to learn how to solder, read schematics, etc. Now that I have the knowledge of what it takes for a beginner in electronics, I would like to share it with you.

This series of articles, presenting a different subject every month, will serve to stimulate interest among those who feel that electronics is so complicated as well as a "brush-up" course for those who think they need it. These articles, hopefully, will take the mystery out of this very popular hobby of today.

The following is a list of the topics to be covered in the series, in the order of appearance. This list is not irrevocably firm and suggestions would be very much appreciated.

1. Basic laws of electronics: Includes description of Ohm's law, some circuit theory (which way the electrons are supposed to go, etc.)
2. Logic, boolean algebra, symbols: This covers the basic boolean operators, table of combinations for these operators, symbols used on logic diagrams.
3. Reading data sheets: Where to find them, what to do with them once you have them, information that can be found in them.
4. Reading a schematic: Description of the symbols used in schematics, how to trace out the circuit that you want.
5. Basic blocks of a system: Description of the basic parts of the computer system, their logical function, control of the signals (memory data, program counter, etc.).
6. Soldering techniques: How to make a good solder joint, the do's and don't's.
7. Wire wrapping: How to do it, when to use it, advantages and disadvantages over soldering.
8. what tools are best: Which tool is right for the job, how to select good tools for microelectronic work.
9. Board construction: How to put the parts on the board, heat restrictions, washing the boards after they are completed.
10. Care of MOS chips: What to touch and what not to touch, how to work on the board which contains these kind of chips.
11. Picking power supplies: Cost consideration, requirements with respect to current and voltage from your system.
12. Using a scope: What do all the knobs mean? Which ones are most important for trouble shooting your computer.
13. Trouble shooting: Where to start, what to look for with regard to the correct signals expected.
14. Noise considerations: Impedance considerations of the wires, why a signal could be "flakey" sometimes and not others.

Suggestions for further reading will accompany each installment.

As stated above, suggestions and recommendations from readers would be most welcome. Please send them, along with tutorial material which you feel we should share, to:

Tricia Wood
SCCS Interface
P.O. Box 5429
Santa Monica, CA 90405

Science Fiction Corner

By Lew Whittaker

Lew Whitaker is an SCCS member with a love of science fiction. When he asked if we'd like to try a little sci-fi in *Interface*, we said "why not". This is an experiment. Perhaps you are outraged that we are "wasting" space which could be used for hard-core computer stuff. On the other hand, you may love the diversion. A third possibility is that you have no strong feelings. We need feedback from readers so that we can know whether to keep science fiction in *Interface*.

In any case, we would like to encourage all readers to do as Lew has – look upon *Interface* as your magazine. Don't stew over its not covering your favorite topic, try an experiment.

Lew has been in computing for a long time, beginning as a programmer at RAND. He's also an incurable entrepreneur. He has a coffee house, a commercial bakery and currently has a new company in the works.

Science fiction seems to appeal to many people with vivid and active imaginations. So, in designing and laying out a magazine to appeal to computer oriented folks, it was concluded that the idea of a non-technical fiction column just might be interesting and worthy of inclusion.

The next step was to define just what is meant by 'Science Fiction'. Detective stories are easy to define,: you need a butler, a creaky old mansion, a crime and, oh yes, a detective. Western stories too are pretty easy; take a cowboy, a bad guy, some sagebrush, and there you are! But science fiction.... ? Does a space probe to another planet constitute the main element of a science fiction story, or would this now be merely another travelog. Does the story of a mad scientist working in a lab to develop a computer the size of a cigaret case constitute science fiction or would it be only worthy of a new product release in Datamation.

Bug Eyed Monsters are still a safe bet for hard core sci fi buffs. The same could be said for stories of galactic wars, of intelligent aliens far superior in all ways to man, of malevolent or kindly robots, or of planets with an innate intelligence ready to devour the unwary space explorer.

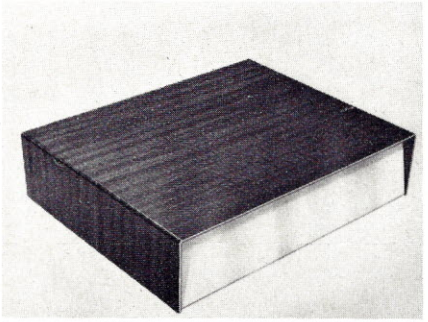
The reason that I question the definition of science fiction is that in the past 30 years our technology has developed at an astronomical rate. Most ideas that Jules Verne dreamt of or those fantasized in the cartoon strips of Buck Rogers have already come to pass. The interesting thing is that our speeding technology shows no sign of slowing down, and may even be accelerating at an ever faster rate.

This column will examine some of the significant authors and stories which have had an influence on the development of modern science fiction writing.

In addition, we will explore where science fiction will lead, or rather what possible directions can be taken. Also, we may publish some original short stories, if they are submitted to our editorial staff.

In our stories and articles, the desired direction will be towards fiction which deals with automated societies, computer developments, the social implications of computers, micro-technology, anything which is akin to our main field of interest. However, at this point, the one thing we are is loose, so if anyone has any suggestions as to direction or content, please fire away. Our goal is to make this column interesting.

New Products



PUT IT IN A PRETTY CASE

Circle No. 18 on Inquiry Card

A new line of economical enclosures, in two sizes and numerous attractive colors and finishes, gives desk-top instruments an appearance contemporary with sophisticated electronic components and systems. Designated Cono-Cases by Vector Electronic Company, the WA series enclosures incorporate a ten-degree sloped front panel and an optional smoked-plastic facing for behind-panel indicators. A recessed rear panel protects input/output connectors.

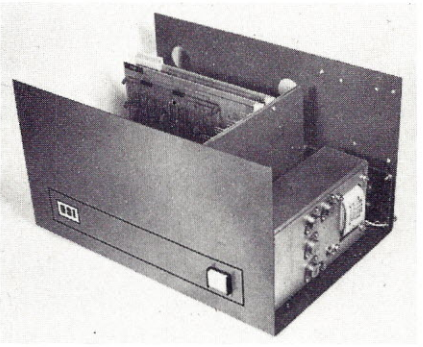
The enclosures, assembled from two interlinked channels, allow easy access to circuits, accessories and wiring. The lower section forms a chassis integrated with front and rear panels. Elongated holes in the bottom and rear panel provide superior convection cooling. The upper section serves as top and side panels. The WA1 enclosures are 11 inches wide by 8 inches deep by 4 inches high, giving 307 cubic inches of circuit space.

The WA2 enclosures are 14 inches wide by 11 inches deep by 4 inches high, providing a 560 cubic inch working volume. Construction of 0.062 inch (14 gauge) aluminum insures adequate support for transformers, heat sinks and other heavy components.

Cono-Cases are available with clear anodize satin finish, or with blue or walnut grained vinyl on the cover. Other colors available in anodize, vinyl or paint on request.

A full line of circuit boards and packaging accessories support the enclosure line.

The WA Series enclosures are priced from $12.95 to $19.70, depending on model and finish. They are available off-the-shelf from Vector and will be available through the firm's distributors throughout the United States and Canada.



OSI

Circle No. 19 on Inquiry Card

The Challenger, a kit-priced but ready-assembled and guaranteed to run OSI computer comes with 1-K of RAM memory, a PROM monitor and serial interface, costs only $439. With 4-K memory, enough to run tiny BASIC, the price is $529. The kit version is from $29 a board. A case and UL-approved power supply, for kit builders, is $149, and the case alone is $59. A special CPU-board allows users to run any 8080, Z80, PDP-8 or 6502 program. Challenger is available from Barefoot Computer Company, Box 158, San Luis Rey, CA 92068; or OSI, 11679 Hayden St., Hiram, Ohio 44234, (216) 569-7945.

- Plated-through hole solder plated G-10 epoxy boards.
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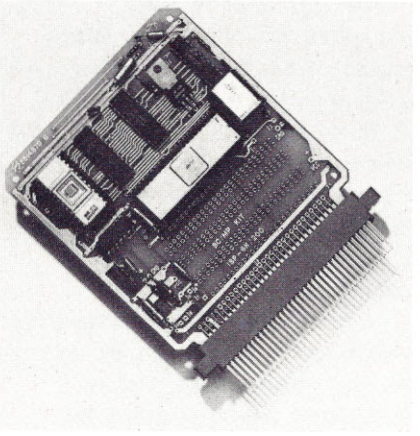
- Processors handled by the OSI system include: 6800, 6502, Z-80, 6100
- System boards include: 4K RAM memory board, 8K PROM memory board with on-board PROM programmer, I/O board with A/D and D/A conversion, wireless backplane board, card extender board to aid in board servicing, prototyping board for custom designing, video graphics board, CPU board, and CPU expander board for multiprocessing – not to mention an audio cassette interface or fabulous Floppy!

These guys are low key – they've sold 1500 kits by word of mouth! Editor.



SKATE BOARDS – ready to hang on the pegboard in Radio Shack stores

Circle No. 20 on Inquiry Card

Pre assembled and fully tested "SC/MP KIT" microcomputer boards are now available from National Semiconductor for individuals and companies who wish to evaluate the "SC/MP" microprocessor without assembling all of the

component parts.

These "SC/MP" 8-bit microcomputer boards – or "SC-8 BOARDS" (pronounced "skate boards") – include all the firmware and components needed for a user to make a full evaluation of the system.

With the 'SC/MP KIT', National had the design engineer and skilled hobbyist in mind. The 'SC-8 BOARD', is for less electronically-skilled people such as mechanical and electromechanical engineers, beginning hobbyists, doctors, lawyers, Indian chiefs – anyone who would like to evaluate a simple microprocessor.

Priced at $125 each in quantities up to ten, the "SC-8 BOARD" measures 4 x 5 inches (10 x 13 centimeters) and incorporates a standard 72-pin edge connector. Each board is fully tested and includes a microprocessor, ROM monitor, 256 bytes of RAM, and a 20ma TTY interface.

For further information, contact: National Semiconductor Corporation – 2900 Semiconductor Drive, Santa Clara, Ca. 95051 (408) 737-5000/TWX (910) 339-9240

Programs and documentation from Tarbell

Circle No. 21 on Inquiry Card

Everyone knows that Tarbell Electronics has been manufacturing audio cassette interfaces almost since the day MITS announced the ALTAIR. Less well known is the fact that they distribute several programs on Tarbell Cassettes and sell supurb documentation.

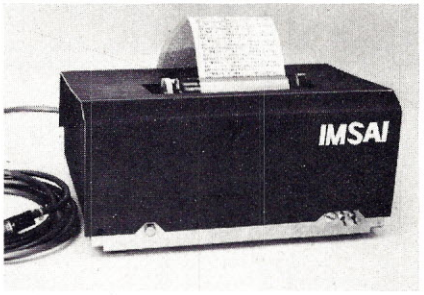
A copy of Rancy Miller's chess playing program (20K bytes) on a Tarbell Cassette, printed documentation and a complete ALTAIR BASIC listing of the program costs $6.00.

Tarbell has also modified Processor Technologies Software Package One to run on a Tarbell system (SAVE and LOAD files) and sells a cassette with the program plus documentation for $5.00. The listing, which is quite long, costs $5.00 more.

Finally, Tarbell sells complete documentation on their cassette interface for only $4.00. Like the rest of the documentation, this is well done and would be of interest to someone who wanted to learn about cassette interfaces, whether he planned to buy a Tarbell or not.

It should be clear that at these prices for a cassette and thirty or forty pages of documentation, this is a no profit operation. On the other hand, they still do offer cassette interfaces for $120.00 (kit) which includes free repair and an *unconditional money back guarantee* if you are not completely satisfied during the first 90 days after purchase.

Contact: Tarbell Electronics, 144 Miraleste Drive, #106, Miraleste, CA 90732 or call (213) 538-4251.



44-Column Printer

Circle No. 22 on Inquiry Card

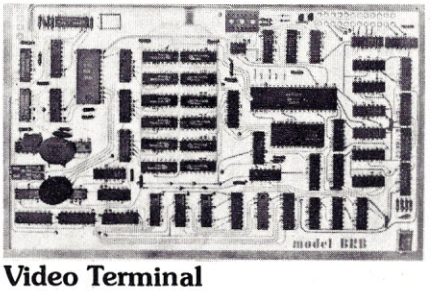
IMSAI announced a new 44-column dot matrix printer designed for use with the IMSAI-8080 computer as well as many other computers. The IMSAI Printer is compact, efficient, and offers hard copy output at an affordable price. It will be available for December, 1976 delivery, priced at $399 in kit and $549 assembled.

The IMSAI Printer interfaces to an 8-bit parallel output port. It is simple to program and install as the printer is self-contained with case, cable, power supply, timing, control and character generation included.

Special features of the IMSAI Printer are:

- Font is standard 64 character ASCII subset.
- Double-size characters are software selectable.
- Automatic line wraparound – output lines with more than 44 characters are printed automatically on two physical lines.
- It offers multiple copy printing using carbon or NCR paper.
- Interfaces to a parallel output port with handshaking.

For further information on the IMSAI Printer write: IMS Associates, Inc., 14860 Wicks Blvd., San Leandro, CA 94577 (415) 483-2093, TWX 910-366-7287. Contact: Gilbert Dean (415) 483-2093



Video Terminal

Circle No. 23 on Inquiry Card

The board-only model consists of a single printed circuit board containing all of the electronics required to interface a video monitor to a keyboard and to a host computer or other terminal at all standard speeds up to 9600 baud. It is ideal for use in stand-alone or conversational mode terminals. It recognizes all model 33 teletype characters along with carriage return, line feed, back space and bell. It generates a composite video output signal capable of displaying all of the characters in the 64 character ASCII set (upper case only) on any standard video monitor. Lower case inputs are automatically converted to upper case for display. It also generates an audio signal for driving a speaker to produce a bell sound.

A complete model B-R-B video terminal including keyboard and monitor is also available. Prices (assembled) Board Only $495, Complete Terminal $875. For further information and options, write to Wintek Corp., 902 N. 9th St., Lafayette, Indiana 47904, (317) 742-6802.

New Products

Interfacing Selectrics to the 8080

Circle No. 33 on Inquiry Card

Dear Friends,

We've noticed quite a few queries relative to using the microcomputer for word processing. We have an up and running system, having interfaced a Selectric to our 8080 We currently use it for information retrieval, networking, stencil preparation correspondence, newsletter composing and mailing labels. We'd be happy to send our 50 page manual on what we did that includes hardware schematics and software for $12 prepaid to any of your readers.

The book covers hardware and software, and may be ordered from: The Center for the Study of the Future, 4110 N.E. Alameda, Portland, OR 97212.

PRICE: 1–4 copies, $12.00 each; 5 or more, $7.20 each.

I've seen output from this system and it is nice. They seem like nice folks too!

I've seen output from this system and it is nice. They seem like nice folks too!

Editor

Very Tiny Language/2

Circle No. 34 on Inquiry Card

VTL/2 is the second Very Tiny Language developed for the Altair 680 computer system. VTL/2 is similar to BASIC, but requires only 768 Bytes of Read-only-memory.

In spite of its small size, VTL/2 includes such advanced features as string functions, numeric and string array facilities, and a built-in Random number generator.

VTL/2 is available as a set of 1702 Read-only-memories that fits onto the sockets provided in the Basic 680 system. Included in the package is the set of PROMS, a user's Manual, a commented source listing and a book of "Games You Can Play in Only 1K". The price of the complete package is $114.00 from the Computer Store, 820 Broadway, Santa Monica, CA 90401, or your local MITS dealer.

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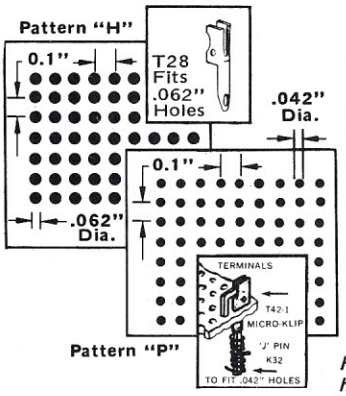
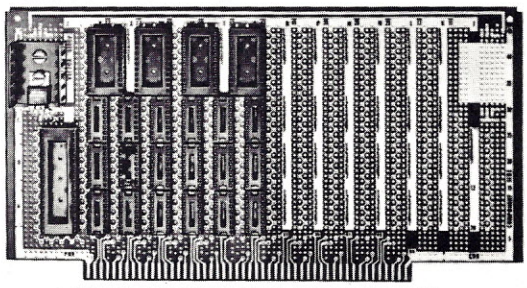


8800V MICROPROCESSOR PLUGBORD



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Universal Cassette Interface System

By Roger Modeen

This article is reprinted from the Northwest Computer Club Newsletter. Roger Modeen describes his cassette interface which runs at low speed for compatability with others and switches into high gear for personal use. He also shares his views on recorders and media. Roger is open for questions and comments and would like to hear from you if there is interest in a PC board for his interface.

We would like feedback from readers on reprinting from club newsletters and other journals. Should we reprint entire articles, merely provide references, distribute reprints, etc.? Most important, let us know if you come across something which you feel is really good and should be shared.

Roger Modeen may be reached at 12035 3rd Ave. S., Seattle, WA 98168, (206) 246-3260.

How's your patience holding up? Starting to get to you, that paper tape reader or so-called "standard" 300 baud cassette interface? Still waiting for a really 'together' digital cassette system at an affordable price? Well, you may have to wait a while yet, but in the meantime, give some thought to the potential still to be realized with your audio cassette machine – if the biggest bottleneck in your system is the time it takes to read serial data, then read on!

With a transfer rate several times higher than other published units, and combining two independent and selectable FSK (frequency-shift keying) channels, this system offers a complete approach to most cassette storage and retrieval requirements. Adjustments are simple, and non-critical. The circuit has none of the drift and other problems commonly found with "MITS-type" phase locked loop designs. (See figures 1 and 2.)

One of the primary requirements is ease of interfacing to an existing serial port, so RS-232C inputs and outputs are provided. No "speed independent" feature has been incorporated, and for good reason. With due apologies to Don Lancaster et al., much undue emphasis in recent articles has been placed on the alleged requirement for speed, independence and elaborate formatting. Somewhere along the way, it seems forgotten that the most important factors in data recording (hobbyist style) are a reasonable data rate and an acceptable error rate. While it is true that a $29 recorder is only $29, it does not follow that it is suitable for employment as one's primary mass storage device! Let those "Saturday Night Specials" of the recorder trade serve their own purpose, and find a quality machine in the $70 and up category which has speed tolerance and 'wow' specifications within one percent or so. Recorders with poor speed tolerance are probably suffering from other shortcomings, and are not worth the trouble. More on recorders and tape selection later.

Looking at the schematic, note that switch S1 selects the 'LO' or 'HI' channel, each of which consists of filters for a particular tone pair. Each section is optimized for minimum practical bandwidth with the specified tone pair and baud rate for that channel. Although deviation is possible from the rates given, filter performance would be less than ideal, and signal-to-noise would suffer.

A 300 baud channel ('LO' position) allows for tone compatibility with Bell 103 standard modem tones[2], and both original and late Altair ACR requirements[3]. The later Altair tone pairs have been spread somewhat, so a satisfactory compromise is incorporated in the filters. If there is some 'standard' which emerges from the proliferation of low speed cassette formats, this is the only one the author is aware of that is actually *used*, and after all, isn't that an important factor for data exchange?

S1 in the 'HI' position places the interface into 2400 baud operation. This has proven to be an acceptable data rate for my own system, and although a few modifications allow operation to 4800 baud, this could be asking a bit much (sic) from our little 1⅞ ips machines! This home system has, however, consistantly loaded "not just anybody's" BASIC and other long programs at the 4800 baud rate with quite good results. In addition, the 2400/4800 hz tone pair is compatible with Lancaster's "Bit Boffer" system when data rates are kept to 600 baud[7].

Dr. Suding states that 1300 or 1400 baud represents a practical limit for an interface of his type[4,5]. His circuit is similar in most respects to this one, both having their origins in teletype unit designs for amateur radio service[6]. Since 1200 baud is still just too slow, an effort which was made to tailor the filter's passband to allow higher speeds, and considerable alteration of the low pass ele-

ment yielded good results at much improved rates.[7,8,9]

Suding has covered the details of a similar circuit[5] as have others[4,9], so comments are confined to important or unique differences and component requirements. 5% tolerance should prove adequate for all resisters and capacitors. Avoid the use of common disk ceramic capacitors in the frequency determining parts of the active filters and tone oscillators. The four LED's on the RS 232C lines are red and green types to denote 'mark' and 'space' respectively, although the use of LED's at all is (of course) optional. Moderate switching rates are present, so plan your wiring layout with attention to ground loops and feedback paths. Most of the usual '741' type internally compensated op amps should work well, and many superior choices exist for those who choose to take advantage of the newer dual or quad types available. Avoid the 'current mirrored' types (LM324, 3900, etc.) as they are prone to instability problems when used in active filters of this type. The new 4136 quad (Raytheon) or the older 747 dual will replace those 741's and give room to spare.

The Exar XR-2206CP function generator chips may be hard to locate, but do *not* substitute for the XR-2206CP! It is a phase continuous sine wave generator for FSK use, and is largely responsible for the excellent overall performance of the circuit.

You may be concerned that the tones used in the 2400 baud section are harmonically related. This has not been a problem, in spite of the distorted waveshape present at the output of the clipper/limiter input stage. Theory comes to the rescue here – square waves are composed of the fundamental plus *odd* harmonics, remember? Besides, Ma Bell has been using 1200/2400 hz in high speed modem applications for years, and it works just fine!

Pick cassettes with care. Features which are an advantage for high fidelity use aren't always those needed for data storage. Coating uniformity, freedom from dropouts, low friction mechanics, and low 'rub-off' are important. Articles in some of the high fidelity publications may offer clues to acceptable

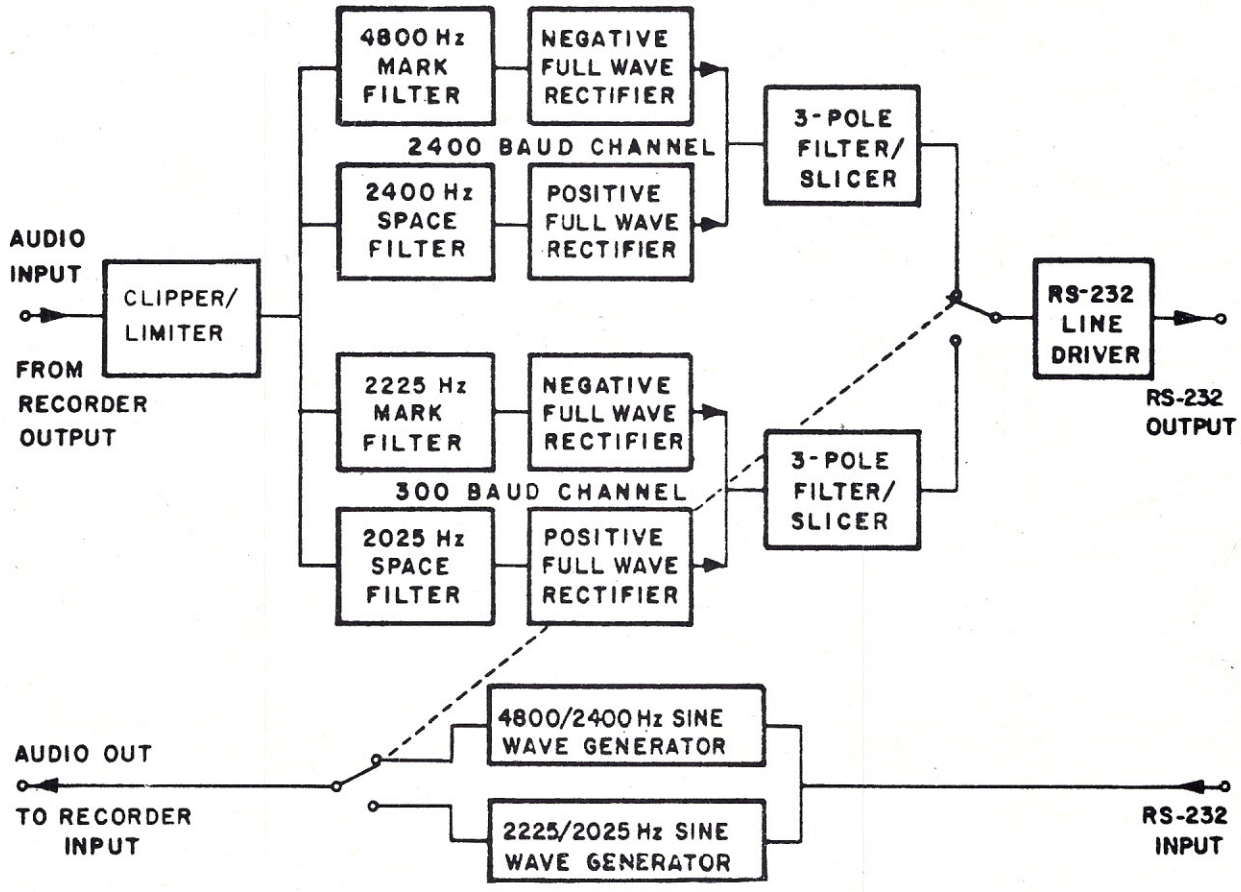

Figure 1 System Overview

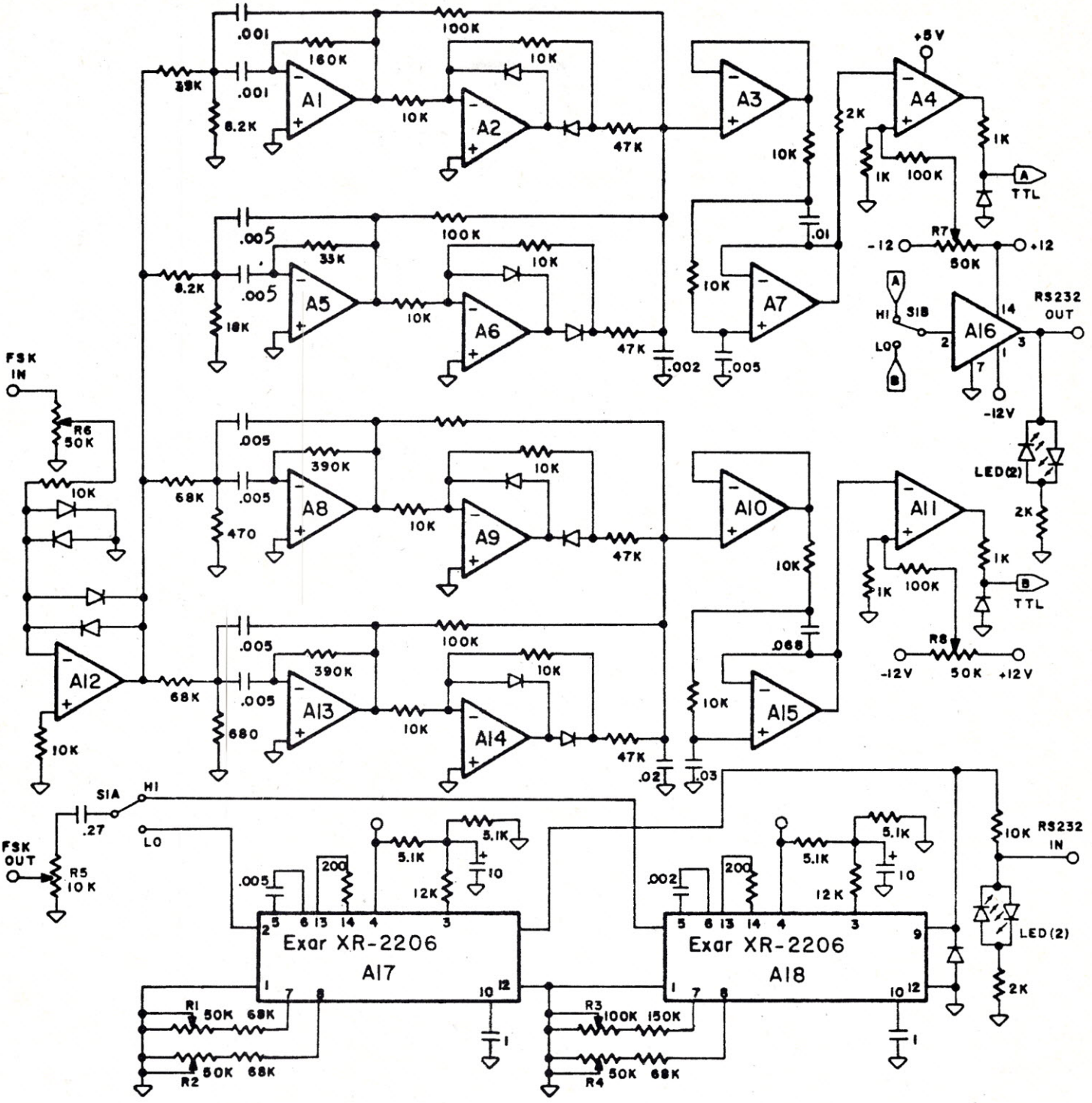

Figure 2. Schematic Diagram of Universal Cassette Interface System.

Tolerance of all components ±5%
A1-A15 are '741 type' op-amps or their equiv.
A16 is a Motorola mc-1488 (only one section used)
All diodes are IN4148 or equiv. signal types.
Except where indicated, decimal values of capacitance are in microfarads (uf).
Resistances are in ohms; K=1000

brands. Avoid cassettes which don't have screws for disassembly, and those with undersized hubs. Cassettes with capacities in excess of 60 minutes may have too thin a base to be reliable. My personal preference is TDK's C-30, a 15 minute per side unit which has high reliability and is also inexpensive. Others have been used with good success – Nakamichi, BASF Superior Mechanics, and Maxell (in order of preference) have been used up to 4800 baud! Be careful though – an isolated sample of tape may be misleading.

Initial adjustment of the system is quite simple and consists of setting R7 and R8 for a 'crossover' condition at the output in the absence of an input signal. This may be done simply by watching the output LED's. In addition, a counter or other accurate method of frequency measurement is recommended to adjust the mark and space tones. R1, R2, R3, and R4 should be set while a −12V (mark) or +12V (space) signal is applied to the RS-232C IN point.

Some experimenting with the record level is needed for an optimum setting. If you can defeat the automatic level feature, or are lucky enough to have a recorder without it, try using a level about 10 to 15 Db below maximum level. This is −10 Db below 0 VU on my Sony portable.

Tailoring of the circuit for individual needs is possible. The TTL output is available at points A and B if required, and TTL input levels to the oscillators can be implemented by merely reversing the frequency adjustment resistances on the 2206's.

The tempting simplicity of this interface method does have significant limitations. Lacking a way to physically halt tape movement under software control, the audio recorder is awkward to use for applications in which data is processed while it is being read. Perhaps a future article could cover a software buffering scheme for playback, in conjunction with a line by line 'file' separation routine.

In summary, for one lacking a truly digital recording method with controlled motors, etc., the technique presented allows a relatively high data transfer rate and a fair amount of flexibility for a minimum of outlay and interfacing 'know-how'. Several club members have already assembled the circuit, and all report excellent results. Some have constructed only the 2400 baud portion as they do not anticipate "interchange" requirements. The author's unit was constructed on Vero perforated board, and wired point to point. I'd like to see enough interest to warrant production of a double sided board!

I'd be happy to answer questions you may have regarding the circuit, and would like to hear of your experiences with it. Believe it or not, if you have time to wait for that paper tape reader to load BASIC, then you've got more than enough time to get that iron hot, so get started!

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3. "New Audio Modulation for ACR", MITS Computer Notes, Vol. 1 #9, Feb. 1976.
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7. Reference Data for Radio Engineers, 6th ed., ITT Corp., 1975, par. 10-3.
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9. V.D. Poor, "Filters for RTTY", RTTY Bulletin, May 1964, pp 1-8.

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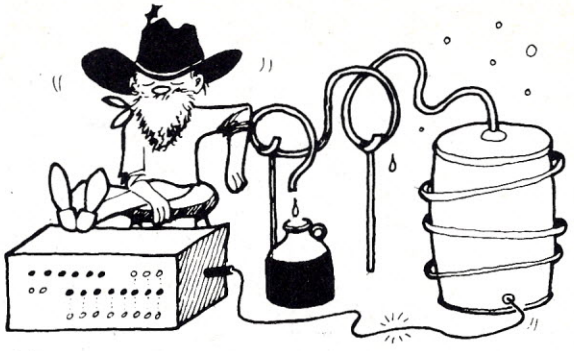

by Tom Rugg and Phil Feldman

This month's game is called WARI. It is one of many games in the Mancala family, which includes Awari, Oware, Kalah, Pallanguli, and literally hundreds of variations on these games. One of these, Awari, is included in *101 Basic Computer Games,* by Digital Equipment Corporation.

The program presented here is a new one, however, and we have not seen another program of this variation of Wari published anywhere.

Wari is a skill game, meaning that there are no chance factors, such as a roll of the dice, involved. If the computer beats you, it's because you were outplayed, *not* because you were unlucky.

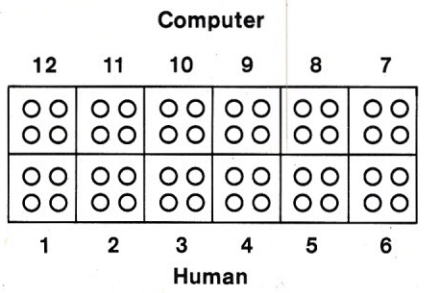

Figure 1: The Wari Board

The game is played on a board containing twelve "cells" (or pits or holes) arranged in two rows of six as shown in Figure 1. At the start of the game, each cell contains four stones (or seeds or marbles). The two players (the human and the computer) sit on opposite sides of the board and alternate moves. In this program, the cells are numbered one through twelve, starting in the lower left corner and going counter-clockwise. So, the human's side has cells one through six, and the computer's side has cells seven through twelve.

The opening player picks up all the stones in one of the cells on his side of the board and drops them one at a time, starting in the next higher numbered cell, continuing over onto his opponent's side if necessary. His opponent then does the same thing, always placing the stones, one at a time, in a counter-clockwise direction.

If the last stone that is dropped by a player falls into his opponent's cell and leaves a total of two or three stones there, these stones are "captured" by the player and removed from the board. In addition, if the second-to-last cell in which a stone is dropped is also on the opponent's side, and also has exactly two or three stones in it after the move, they are also captured. This continues until the string of twos and threes on the opponent's side is broken. The winner of the game is the first player to capture 24 or more stones (half of the 48 at the start of the game).

That's all there really is to the game, except for a few special situations we will mention now. A player is not allowed to capture all the stones on the opponent's side of the board, since this would leave the opponent with no moves on his next turn. Similarly, when your opponent has no stones on his side of the board (because he moved his last one to your side on his turn), you must, if possible, move in such a way that he will have at least one stone to move on his next turn. If not possible, the game is over and counted as a draw. If a cell has twelve or more stones in it, moving that cell will cause distribution of stones clear around the board. In this case, the cell from which the player moved is skipped over, as the stones are dropped around the board. In other words, when you move from a cell, that cell is always going to be left empty, until a subsequent move puts a stone there.

The Wari Program

Wari is a non-trivial game (like chess or go) in that there is no known "best" move in most situations. The computer program therefore cannot evaluate the board position and select the optimal move (such as it could in a trivial game like tic-tac-toe). Instead, this program evaluates all of its possible moves and all of its opponent's possible replies, to determine if it will come out on top in an exchange of captures. If it would come out on top, it makes the appropriate move. If it would come out even, the move is selected that would leave the board in the most favorable position possible (based on some simple factors, such as the number of cells the computer would have with a non-zero number of stones). If you can come up with a superior method of evaluating board positions, or if you can look farther ahead, then you can beat the program. And you *can* beat the program. But not until you've been beaten by it a few times, we'll wager.

The program is written in MITS 8K Basic and will run on a 10K machine (if anybody has such a thing). We couldn't quite cram it into an 8K machine.

Because it has a lot of "thinking" to do, the program takes quite a while to come up with each of its moves – usually between 15 and 45 seconds on an Altair 8800 running at full speed. We thank the Computer Store in Santa Monica, by the way, for letting us use one of their Altairs.

Figure 2 is a listing of the Wari program, and Figure 3 shows the beginning of a sample game.

```
100 REM *** WARI -- BY TOM RUGG AND PHIL FELDMAN.  AUG, 1976. ***
110 U=1:J=U:X=6:Z=0:Q=14:P=13:H=100:D=12:W9=.25:G=4:T4=24:T2=2
120 DIM T(Q),Y(Q),W(Q),V(X),E(X),B(Q)
124 INPUT"HOW ABOUT A RANDOM NUMBER";M
126 R1=RND(-M)
130 PRINT:PRINT"** THE GAME OF WARI **":PRINT
140 FOR J=U TO Q:B(J)=G:NEXT J
150 B(P)=Z:B(Q)=Z:M1=Z
154 R1=RND(U):R1=R1/D:W1=W9+R1:W2=W9-R1
160 INPUT"WANT TO GO FIRST (Y OR N)";A$
170 IF A$="N" THEN 270
180 IF A$<>"Y" THEN 160
190 GOSUB 820
200 INPUT"YOUR MOVE";M:IF M>X THEN 200
210 FOR J=U TO Q:T(J)=B(J):NEXT J:GOSUB 340
220 IF M<Z THEN PRINT"ILLEGAL":GOTO 200
230 FOR J=U TO Q:B(J)=T(J):NEXT J
235 M1=M1+U:IF M1<X THEN GOSUB 820
240 IF B(P)<T4 THEN 270
250 GOSUB 820
260 PRINT"YOU WIN":GOTO 130
270 GOSUB 600
280 PRINT"MY MOVE IS";M
290 FOR J=U TO Q:T(J)=B(J):NEXT J:GOSUB 340
300 FOR J=U TO Q:B(J)=T(J):NEXT J
310 IF B(Q)<T4 THEN 190
320 GOSUB 820
330 PRINT"I WIN":GOTO 130
340 IF M<U THEN 370
350 IF M>D THEN 370
360 IF M=INT(M) THEN 380
370 M=-U:RETURN
380 IF T(M)=Z THEN M=-T2:RETURN
390 I=Z:IF M>X THEN I=U:GOTO 410
400 FOR J=U TO Q:Y(J)=T(J):NEXT J:GOTO 430
410 FOR J=U TO X:Y(J)=T(J+X):Y(J+X)=T(J):NEXT J
420 Y(P)=T(Q):Y(Q)=T(P):M=M-X
430 N=Y(M):C=M
440 FOR J=U TO N:C=C+U
450 IF C=P THEN C=U
460 IF C=M THEN C=C+U
470 IF C=P THEN C=U
480 Y(C)=Y(C)+U:NEXT J
490 Y(M)=Z:L=C
500 IF L<U+X THEN 540
510 IF Y(L)>=G THEN 540
520 IF Y(L)<T2 THEN 540
530 Y(P)=Y(P)+Y(L):Y(L)=Z:L=L-U:GOTO 500
540 S=Z:FOR J=U+X TO D:S=S+Y(J):NEXT J
550 IF S=Z THEN M=-T2-U:RETURN
560 IF I=Z THEN FOR J=U TO Q:T(J)=Y(J):NEXT J:GOTO 590
570 FOR J=U TO X:T(J)=Y(J+X):T(J+X)=Y(J):NEXT J
580 T(Q)=Y(P):T(P)=Y(Q)
590 RETURN
600 FOR A=U TO X
610 M=A+X:IF B(M)=Z THEN E(A)=-H:GOTO 785
620 FOR J=U TO Q:T(J)=B(J):NEXT J:GOSUB 340
630 IF M<Z THEN E(A)=-H:GOTO 785
640 IF T(Q)>=T4 THEN M=A+X:RETURN
644 FOR J=U TO Q:W(J)=T(J):NEXT J
650 FOR R=U TO X:IF T(R)=Z THEN V(R)=H:GOTO 760
660 FOR J=U TO Q:T(J)=W(J):NEXT J
670 M=R:GOSUB 340
674 IF M<Z THEN V(R)=H:GOTO 760
680 F1=Z:F2=Z:F3=Z:F4=Z:F5=Z
690 FOR J=U+X TO D:F2=F2+T(J)
700 IF T(J)>Z THEN F1=F1+U
710 IF T(J)<=T2 THEN F3=F3+U
720 IF T(J)>F4 THEN F4=T(J)
730 NEXT J:F5=F2:FOR J=U TO X:F5=F5+T(J):NEXT J
740 F1=F1/X:F4=U-(F4/F2):F3=U-(F3/X):F2=F2/F5
750 V(R)=(W1*(F1+F2))+(W2*(F3+F4))+(T(Q)-B(Q))-(T(P)-B(P))
760 NEXT R:E(A)=H
770 FOR J=U TO X:IF V(J)<E(A) THEN E(A)=V(J)
780 NEXT J
785 NEXT A
790 M=Z:A=-H:FOR J=U TO X
800 IF E(J)>A THEN A=E(J):M=X+J
810 NEXT J:RETURN
820 FOR J=U TO X
830 PRINT TAB((J-U)*G);B(P-J);:NEXT J
840 PRINT TAB(T4+T2);"I'VE CAPTURED   ";B(Q)
850 FOR J=U TO X
860 PRINT TAB((J-U)*G);B(J);:NEXT J
870 PRINT TAB(T4+T2);"YOU'VE CAPTURED ";B(P)
880 RETURN
```

Figure 2.

```
RUN
HOW ABOUT A RANDOM NUMBER? 16.7

** THE GAME OF WARI **

WANT TO GO FIRST (Y OR N)? Y
 4   4   4   4   4   4     I'VE CAPTURED    0
 4   4   4   4   4   4     YOU'VE CAPTURED  0
YOUR MOVE? 3
 4   4   4   4   4   5     I'VE CAPTURED    0
 4   4   0   5   5   5     YOU'VE CAPTURED  0
MY MOVE IS 7
 5   5   5   5   5   0     I'VE CAPTURED    0
 4   4   0   5   5   5     YOU'VE CAPTURED  0
YOUR MOVE? 2
 5   5   5   5   5   0     I'VE CAPTURED    0
 4   0   1   6   6   6     YOU'VE CAPTURED  0
MY MOVE IS 10
 6   6   0   5   5   0     I'VE CAPTURED    2
 5   1   0   6   6   6     YOU'VE CAPTURED  0
YOUR MOVE? 6
 7   7   1   6   6   1     I'VE CAPTURED    2
 5   1   0   6   6   0     YOU'VE CAPTURED  0
MY MOVE IS 10
 7   8   0   6   6   1     I'VE CAPTURED    2
 5   1   0   6   6   0     YOU'VE CAPTURED  0
YOUR MOVE? 5
 7   9   1   7   7   2     I'VE CAPTURED    2
 5   1   0   6   0   1     YOU'VE CAPTURED  0
MY MOVE IS 11
 8   0   1   7   8   3     I'VE CAPTURED    2
 6   2   1   7   1   2     YOU'VE CAPTURED  0
YOUR MOVE? 5
 8   0   1   7   8   3     I'VE CAPTURED    2
 6   2   1   7   0   3     YOU'VE CAPTURED  0
MY MOVE IS 8
 9   1   2   8   0   3     I'VE CAPTURED    2
 7   3   2   8   0   3     YOU'VE CAPTURED  0
YOUR MOVE? 1
MY MOVE IS 9
 10  2   3   0   1   4     I'VE CAPTURED    4
 1   5   4   10  0   4     YOU'VE CAPTURED  0
YOUR MOVE? 1
MY MOVE IS 8
 10  2   3   1   0   4     I'VE CAPTURED    4
 0   6   4   10  0   4     YOU'VE CAPTURED  0
YOUR MOVE?
```

Figure 3.

Professional Computer Educational Organizations

By Jean Rice

One of our goals is to bridge any gaps which exist between the relatively new micro computer user and the professional establishment. Jean Rice has provided us with an overview of the professional societies dealing with computers in education. We would like to publish similar articles in other fields, if authors are interested.

Jean is a well known worker with computers in education. She teaches, has done a lot of curriculum development, is the author of a textbook, and is a member of each of the organizations she reviews in her article.

Jean is also a founder of and enthusiastic worker in the Minneapolis Chapter of SCCS.

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A number of independent professional educational organizations exist in the country for persons interested in computers. Three of these organizations are the Association for Educational Data Systems (AEDS), National Association of Users of Computer Applications to Learning (NAUCAL), and the Association for the Development of Computer-Based Instructional Systems (ADCIS). Each group sponsors an annual conference at various locations throughout the United States and Canada.

AEDS

The Association for Educational Data Systems (AEDS) is a nonprofit, private educational organization founded in 1962 by a group of professional educators and technical specialists in educational applications. Its intention is to provide a forum for the exchange of ideas and information about the relationship of modern technology to modern education.

AEDS membership is open to all persons interested in learning more and keeping informed about current developments and directions in educational data systems and computer technology. Included in the membership are educators and technical experts from all over the United States, Canada and other countries representing public and private schools, higher education, state and provincial departments of education, the federal government, the Armed Forces and other professional and technical groups interested in educational computer applications.

The annual international conference is held to bring together key people from education and technical specialties. Executives, administrators from all levels of education, and all types of research, manufacturing and commercial service organizations are represented at this conference. The 1977 AEDS conference will be held in Ft. Worth, Texas, April 25-29, with President E. Ronald Carruth officiating.

An annual AEDS computer programming contest is held for secondary school students in grades 7-12. The contest is on the approved list of contests and activities published by the National Association of Secondary School Principals.

Local chapters regularly sponsor workshops and seminars on relevant topics designed to advance education by developing a great awareness of the impact of educational technology.

AEDS publications include the AEDS Monitor and AEDS Journal, which are published quarterly and the monthly AEDS Bulletin.

For more information concerning AEDS, contact the Association for Educational Data Systems, 1201 Sixteenth St. SW, Washington, D.C. 20036.

NAUCAL

The National Association of Users of Computer Applications to Learning (NAUCAL) is a functional affiliate of AEDS.

The NAUCAL constitution states "To improve the teaching-learning process, NAUCAL is hereby organized as an association through which representatives of user institutions can influence the direction, development, evaluation and dissemination of computer applications to learning."

The association shall act to achieve this purpose by:

A. providing for the interchange of information, evaluation, results, and resources among participating institutions.
B. setting suggested standards and specifications for hardware, system software, and instructional software based on experience of active users.
C. reviewing, evaluating and encouraging proposals for computer applications to learning.
D. encouraging the development of a common programming language designed for computer applications to learning.
E. preparing and supporting position papers on the critical areas

and problems of developments in computer applications to learning.

F. providing consultant and informational services to institutions considering involvement in computer applications to learning.

Membership in the association consists of representatives of governmental agencies and educational institutions, both public and non-public, who are primarily interested in the development and/or use of computer applications to learning at the precollegiate and collegiate levels; and to representatives of those commercial houses who are interested in the development of curriculum, software, hardware and communications to support computer applications to learning. For more information write: Donald Holznagel, TIES, 1925 W. County Rd. B2, St. Paul, MN. 55113.

ADCIS

ADCIS, Association for the Development of Computer-Based Instructional Systems, is a non-profit international organization, which originated in 1968 as an IBM 1500 Systems User Group. The organization later became independent of IBM. Currently members represent both education and industry. Education is represented by elementary through university-level members. Industrial manufacturers and computer vendors represent industry.

The purposes of ADCIS are the following:

1. Advance the investigation and utilization of computer-assisted instruction (CAI) and computer-managed instruction (CMI).
2. Promote and facilitate the interchange of information, programs, and materials.
3. Reduce redundant effort among developers.
4. Specify requirements and priorities for hardware, software, and courseware and encourage and facilitate their realization.

IG's (Interest Groups) are formed within ADCIS to provide time for members with common interests to meet. As of this writing, there are five IGs, each with an elected chairperson. These groups include ESJCU (Elementary-Secondary-Jr. College-University); HENUG (Health Education Network Users Group); HSIG (Health Sciences Interest Group); IIG (Implementation Interest Group); SIGED (Special Interest Group of Educators for the Deaf). Subset groups of the IIG include the Minicomputer Users Group, Plato Users Group, and Coursewriter Users Group.

ADCIS publishes the quarterly Journal of Computer-Based Instruction and the ADCIS News which is a bimonthly publication.

For more information concerning ADCIS write to ADCIS president, Dr. Alan G. Smith, University of Maine Portland Gorham, 103 Bailey Hall, Gorham, Maine 04038.

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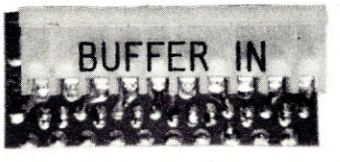

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Basic Strings

By George Hockney

In this article, George Hockney discusses the sorts of string operators typically found in BASIC interpreters, and presents examples of their use.

George received a Bachelor of Science degree in Physics from California State University, Long Beach in the spring of 1976. He has written several large BASIC programs including a self-teaching mathematics tutor, a coded clerical support system, and an 8800 microprocessor emulator. He will enter the University of California at Los Angeles to complete his preparation for a Doctorate of Science in Physics.

One of the most powerful features of the BASIC language, and the one that most distinguishes it from FORTRAN, is its capability to handle strings. This is done by introducing a new kind of variable, called a *string variable,* into the language. The following programs illustrate a typical usage of a string variable.

```
10 PRINT "THIS IS A
   LITERAL"
20 END
```

Results in the following output:

```
THIS IS A LITERAL
```

This program does the same:

```
10 B$="THIS IS A LITERAL"
20 PRINT B$
30 END
```

In the first program, the literal THIS IS A LITERAL was stored in the PRINT statement; in the second, it was stored in the string variable B$. As a matter of convention, a string variable in BASIC is designated by putting a $ after any legal numeric variable. B$, G6$, and H$(12) are all valid string variables. H$(12) is a member of an array of strings.

We see from these examples that string variables are similar to numeric variables in BASIC in that they may be assigned a value; however, they differ in that the value assigned to a numeric variable is a real number and that assigned to a string variable is a string of alphanumeric characters.

Similarly various operators may be applied to numeric variables. For example, if we are dealing with numeric variables, operators such as +, −, SIN, EXP, etc. are meaningful. When dealing with strings, other sorts of operations make sense, for instance, we might wish to join two strings together, take a portion of a string or find its length. This article introduces the reader to the string operators which are available in the dialect of BASIC which runs on my machine. Your interpreter may have slightly different names for the operators, but their functions should be the same.

To begin with, let us look at the operator "+", which does exactly what you would expect it to. It appends one string to the end of another. Here is a simple example:

```
10 B$="BLOOD TYPE"
20 C$="A"
30 D$="B"
40 E$=C$+D$
50 PRINT ,, B$
60 PRINT "O",C$, D$, E$
70 END
```

The result of this program is

```
          BLOOD TYPE
O         A         B         AB
```

Here is another example, which uses the input statement:

```
10 INPUT N$
20 B$="HELLO, "+N$+",
   HOW ARE YOU?"
30 PRINT B$
40 END
```

Running this gives:

```
? JOHN Q. DOE
HELLO, JOHN Q. DOE,
HOW ARE YOU?
```

Notice the importance of *spaces* in strings. They must be carefully counted for good results.

The usefulness of string variables is greatly enhanced by the existence of string functions. While the available string functions vary from system to system, there will usually be a substitute for the ones used below. Remember to check your language manual for the appropriate form of the function to use; don't expect these programs to run exactly as written.

In the previous example, the computer called the user by the name that was typed in (John Q. Doe), without modification. If there are many machine-generated questions, this could become stodgy. (Could you imagine, WHAT'S UP, EDWARD QUINCY FRIMTRAMMER?). It would be much neater if the computer could somehow call a person by his first name. This can be done easily with the LEFT and INSTR functions.

The string function LEFT(A$,x) returns another string; the string that is the first x characters of the string A$, as this example shows:

INSTR is the function which is most likely to be slightly different on your machine. It may be called SUBSTR or some other name and there may be additional arguments

```
10 PRINT LEFT
   ("THIS IS A STRING", 2)
20 PRINT LEFT
   ("THIS IS A STRING", 12)
30 END
RUN
TH
THIS IS A ST
```

(Blanks are included in the count!!!). This is the first thing we have to know to pull off the first word. However (you've probably forseen this already), the first name can be any number of characters long. If we were to write the program this way:

```
10 PRINT "WHAT'S YOUR
   NAME";
20 INPUT N$
30 M$=LEFT(N$,4)
40 PRINT "HELLO,"+M$
50 GO TO 10
60 END
```

we would get

```
WHAT'S YOUR NAME?
JAMES KRIK
HELLO, JAME
WHAT'S YOUR NAME?
JANE DOE
HELLO, JANE
WHAT'S YOUR NAME?
GERALD FORD
HELLO, GERA
```

Sorry, James and Gerald, it isn't quite ready yet. We have to have some way of determining when the first blank occurs in the input string. Fortunately, there is a function that will let us do just that. It is called INSTR. INSTR(A$,B$) returns the position of the first occurence of B$ in A$.

For example, INSTR ("ABCDE", "C") is 3 because C is the third character in the string ABCDE. Similarly, INSTR ("FROGS ARE GREEN", "GREEN") is 11 .... INSTR will return a 0 if there is no occurance of the second string in the first. For instance, INSTR ("HI FRIEND", "Q") is 0 because there are no Q's in the first string.

which let you find the location of the nth occurence of B$ in A$, or let you start in the middle of A$. Check your manual.

Continuing our example, we can now print first names only. Our strategy for clipping off the first name is to look for the position of the first *blank* with INSTR and then take all characters up to but not including the blank with LEFT. We must also check for the special case where there is no blank, that is, where the first name was all that was INPUT. This program does this:

```
10 PRINT "WHAT'S YOUR
   NAME"
20 INPUT N$
30 IF INSTR(N$, " ")=0
   then N$=N$+" "
40 X=INSTR(N$, " ")
50 X=X-1
60 N$=LEFT(N$,X)
70 PRINT "HELLO, ";N$
80 GO TO 10
90 END
```

It gives

```
WHAT'S YOUR NAME?
JANE DOE
HELLO, JANE
WHAT'S YOUR NAME?
GERALD FORD
HELLO, GERALD
WHAT'S YOUR NAME? JACK
HELLO, JACK
WHAT'S YOUR NAME?
MR. ARNOLD BENEDICT
HELLO, MR.
```

Oops! That last entry doesn't conform to our model of how names look, and therefore the computer analyzed it incorrectly. One of the biggest problems in this sort of programming is to write a program that will give acceptable analyses to all sorts of oddball input. Remember as you write programs that users can be very resourceful when it comes to fouling things up. To correct the last glitch, we can check to see if the first word is a title. How can that be accomplished? Well, most titles end in periods, so we might check to see if the first word ends in a period. We could also see if the first word has a period in it at all, which is simpler and probably won't get us into too much trouble. Having done that, the next step is to take the last word in the string, so we would turn MR. BENEDICT ARNOLD into MR. ARNOLD. This accomplishes our original goal of non-stuffiness.

To do this, we have to use the RIGHT function. RIGHT(A$,x) returns a string that is the xth character in A$ and all characters after the xth character as this program illustrates:

```
10 B$="12AB34CD"
20 PRINT RIGHT(B$,3)
30 PRINT LEFT(B$,4);
   RIGHT(B$,4)
40 END
RUN
AB34CD
12ABB34CD
```

Notice that LEFT+RIGHT does *not* give back the original string. Now we can use this to find the *last* space in a string. Be sure to analyze this program carefully and understand every step; it's tricky.

```
10 INPUT T$
20 IF INSTR(T$," ")=0
   THEN GO TO 100
30 T$=RIGHT(T$,INSTR(T$,
   " ")+1)
40 GO TO 20
100 PRINT T$
110 GO TO 10
120 END
RUN
?THIS IS A STRING
STRING
?MR. DONALD ROR
ROR
(etc.)
```

Remember that the INSTR function returns 0 if the second string does not appear in the first, in this case, if there are no more blanks.

Now we can put the last two segments together to obtain a new name-pulling program. The flow chart is shown in figure 1.

and the program is this:

```
10 PRINT "WHAT'S YOUR
   NAME"
20 INPUT N$
```

```
 30 IF INSTR(N$," ")=0
    THEN N$=N$+" "
 40 M$=LEFT(N$, INSTR
    (N$," ")-1)
 50 IF INSTR(M$,".")=0
    then 95
 60 T$=N$
 70 IF INSTR(T$," ")=0
    THEN GO TO 90
 75 T$=RIGHT(T$, INSTR
    (T$," ")+1)
 80 GO TO 70
 90 M$=M$+T$
 95 PRINT "HELLO, "+M$
100 GO TO 10
110 END
```

This results in

```
WHAT'S YOUR NAME?
JOHN Q. DOE
HELLO, JOHN
WHAT'S YOUR NAME?
EDWARD TUPPER
HELLO, EDWARD
WHAT'S YOUR NAME?
DR. FRED ASPIC
HELLO, DR. ASPIC
WHAT'S YOUR NAME?
E.T. SHUNT
HELLO, E. SHUNT
```

Note that the last case was not accounted for in our reasoning. There are many improvements possible in this routine, of course, such as a segment that would turn JAMES into JIM, but the above would normally be sufficient. If you like, you can add to it until you run out of either core or patience.

There are a few other useful string functions in most BASIC systems. Two of these are MID and LEN. MID lets you pull a piece out of the middle of a string; LEN tells you how long a string is. The following program demonstrates them:

```
 10 B$="I GO DOWN"
 20 FOR J=1 TO LEN(B$)
 30 PRINT MID(B$,J,1)
 40 NEXT J
 50 PRINT "I GO ACROSS"
 60 END
```

The result is

```
I

G
O
```

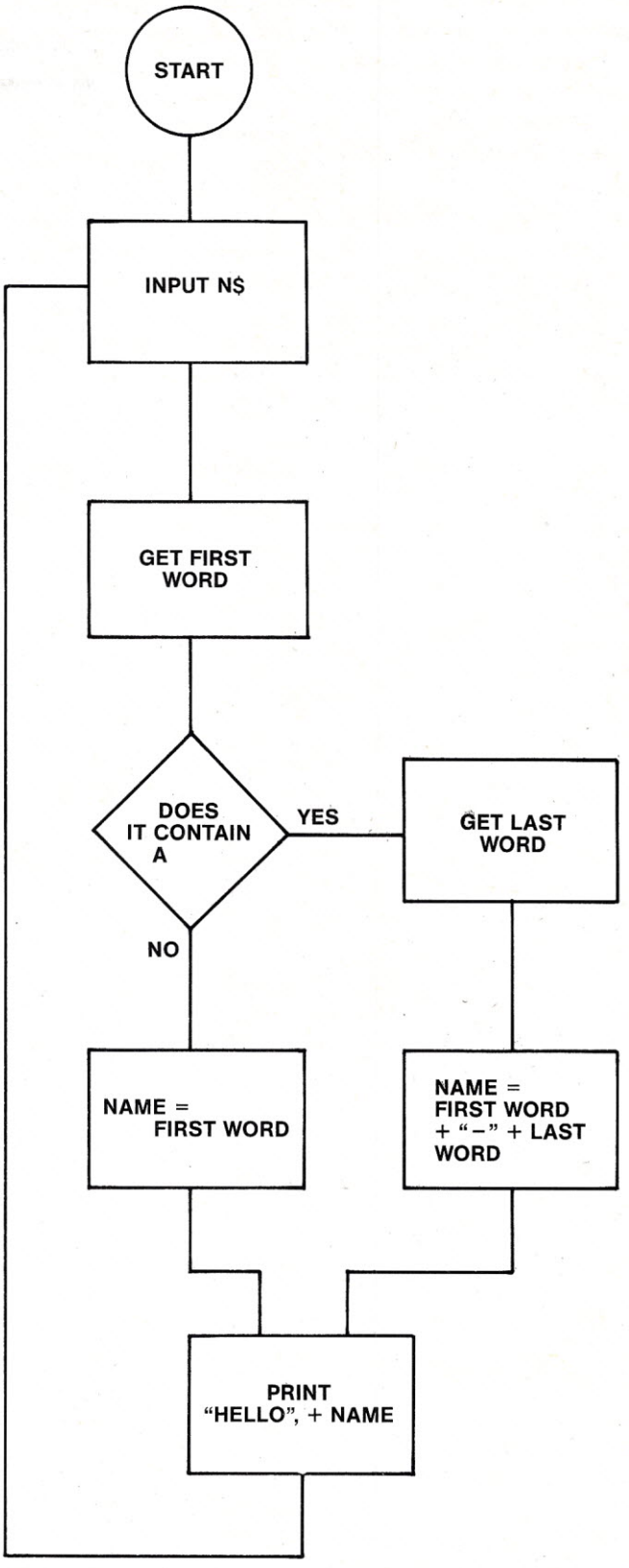

FIGURE 1

D
O
W
N
I GO ACROSS

The arguments of the MID are the string (B$), the position to start at (J), and the number of characters to pull out (1).

There is also a function called STRING$ that returns a string of one character, for instance, STRING$ ("K",10) is KKKKKKKKKK. This program uses it in a devious fashion:

```
10 B$="I GO DOWN"
20 C$="I GO SIDEWAYS"
30 FOR J=1 TO LEN(B$)
40 PRINT MID(B$,J,1);
   STRING$(" ",INT(J/4);
50 PRINT MID(C$,J,1);
   STRING$(" ",LEN(B$)-
   INT(J/2));MID(C$,J,1)
60 NEXT J
70 PRINT "I GO ACROSS"
80 END
```

Believe it or not, running this gives:

```
 I I          I

 GG           G
 OO           O

 D  S         S
 O  I         I
 W  D         D
 N   E        E
      W       W
      A  A
      Y  Y
      S  S
I GO ACROSS
```

These are the common string functions available in BASIC. As was mentioned previously, these vary considerably from interpreter to interpreter so it is necessary to check the language manual for your BASIC to find the right form for all of them. Clever use of string variables leads to an eloquent form of programming, where the computer can actually talk to the user in a good approximation of normal English.

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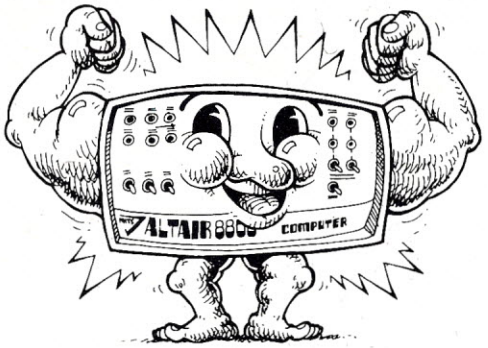

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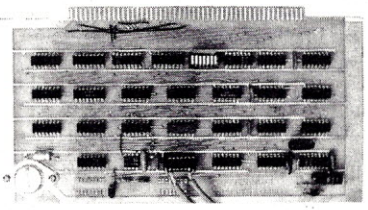

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Book Review

We would like to broaden the scope of content and participation in the *Reviews* section of Interface.

In addition to books, we would like to begin reviewing articles from club newsletters, magazines, trade journals, and computer science publications. Other material such as computer art, fiction, films, music, etc. should also be reviewed.

We can do this if members are willing to put in some effort. If you read a *good* article, etc., jot down (or double-space type if you're up for it) a few sentences or paragraphs describing it, being sure to include enough information to enable someone else to obtain a copy, and send them to us. If the article seems hard to get, for example from a club newsletter, a Xerox copy would also be appreciated. If we get a copy, we'll be willing to distribute it to anyone sending SASE and 5¢ per page, provided that we can get permission.

It has also been suggested that we publish the tables of contents of club newsletters and distribute copies of articles (at cost) to those requesting them. Does this sound like a good idea to you?

Game Playing With Computers
(revised Second Edition)
by Donald D. Spencer
$14.95
Hayden Book Company, Inc.
Rochelle Park, New Jersey
Review by Tom Rugg

This book is a revised edition of a book that Spencer originally had published by Spartan Books in 1968. Unfortunately, a side-by-side comparison shows that not that much has really been revised from one edition to the next. Some references are updated (including the excellent bibliography), some typos are corrected, and two appendices are deleted (brief introductions to FORTRAN and Basic). Very little of substance has been altered.

In spite of this, the book is an important one for the devoted computer game-player. The rules of many games are presented, with the suggestion that they might make good computer games for the reader to develop. Several other games are flowcharted, but not programmed. These include roulette, a knight's tour, and tic-tac-toe.

About 25 program listings are scattered throughout the book. The majority are in FORTRAN, with the remaining few being in Basic. Spencer considers puzzles to be a type of game, and many of his programs are puzzle-solving ones, rather than interactive games. So, in addition to things like pick-a-number games, there are things like magic square generators, a "15 puzzle" program, and prime number generators.

The main drawbacks of the book are that it devotes an inordinately large amount of space to magic squares (about one-third of the book), and that disappointingly little discussion is presented about methods of programming the strategies of computer games. In addition, most of the games for which complete programs are provided turn out to be pretty simple ones. The most interesting games generally have only their rules presented or some sample output exhibited. Interesting, but frustrating.

In spite of these drawbacks, this book was a landmark when it was first published, and the revised edition is still an excellent source of ideas for the computerist who is searching for new games to program.

Digital Computers Made Simple
By Saul Heller
Ameco Publishing Corp.
Reviewed by Bill Maxey

The preface of this book indicates that it has been written for the layman with no knowledge of digital computers, but don't expect an indepth coverage of the subject.

The book introduces the reader to the binary number system and binary arithmetic. It continues with an introduction to programming by explaining how the computer "understands" programming languages, and how it responds.

Input/output devices are discussed, as well as memory devices. The book closes with an explanation of basic circuits used in computers. Each chapter is broken down into sub-sections, making each new concept easier to understand.

In the chapter on Computer Memory, it is unfortunate that no mention is made of integrated circuit, bipolar or MOS memory since these are so commonly used in today's computers. Also, in the chapter, Computer Circuits, the author might have cut short his discussion of discreet circuits and jumped directly into TTL circuitry – the circuitry used almost universally in computers. There is no mention of TTL at all.

Digital Computers Made Simple is a preliminary introduction to the subject of computers, which should be augmented by the reader with slightly more advanced texts in areas covering ICs and TTL circuitry.

Chess & Computers
By David Levy,
1976, $7.95 paperback
Computer Science Press, Inc.,
4566 Poe Avenue,
Woodland Hills, CA

We received this book for review and want to mention it briefly since it looks as if it is of general interest.

The table of contents is as follows:
Chess Machines
How Computers Play Chess
The Early History of Computer Chess
The Modern Era of Computer Chess
Computer Chess Tournaments
Current Research & Future Prospects
Bibliography

Levy is director of the annual U.S. Computer Chess Championship and is the man who has the famous standing offer of $5,000 to any program which beats him by 1978. In addition to this overview book, Computer Science Press publishes an annual series describing and analyzing the Computer Chess Tournament ($3.95 each).

A complete review of this and other books on computer chess will appear next month.

Books in Brief
By Sheila Clarke

A *Software Reference Library* is being compiled by Scientific Research Instruments Co., which comprises about a hundred computer programs written in BASIC. The programs are to be divided into 3 volumes ranging in price from $25 to $30 each and $39.95 for I and II as a set. Each volume is to be approximately 260–300 pages containing source code and instructions for each program, each executing in less than 3K of memory. The first two volumes are planned for release about the time of this publication's mailing, and the third before the end of the year.

Volume one is divided into two basic groups: Part I is business and individual bookkeeping programs; Part II is games and pictures. Volume two deals with math and engineering programs & plotting and statistics. Volume three, still in the planning stages, will deal with advanced business programs and circuit analysis programs.

A glance at the table of contents gives us the impression that owning the first volume is a must for business people and hobbyists alike. Part I included titles like Compound (computing compound interest rates), Decision 1 (lease/buy decisions), Decision 2 (decides whether or not to buy a component, or make it), Order (inventory purchase decisions). Part 2 includes space and war games, roulette, checkers and Teach Me, teaching the computer to learn new things.

Order information is expected to appear in this and other publications soon. For more information, write Scientific Research Instruments Co., P.O. Drawer 2096, Ashland, VA 23005.

Modern Guide to Digital Logic: Processors, Memories and Interfaces by United Technical Publications is published by Tab Books and is available hardbound at $9.95 and paperback at $.95. Published in April, 1976, this is an up to date guide on advanced digital logic circuits, Schottky TTL, CMOS logic, microprocessors and bipolar and MOS memory systems.

The emphasis here is on interfacing covering everything relating to logic systems, and how logic families can most easily be incorporated into new, and existing systems. Advanced memory systems consist primarily of RAMs, ROMS, and first-in/first-out register files. Design factors are discussed regarding the overall system objectives, including future applications. The book's 294 pages include 222 illustrations and appears to be a good reference for the advanced, hardware-oriented hobbyist.

Translation of Computer Languages by Fred W. Weingarten is published by Holden-Day and priced at $11.95. Although the date of publication is 1973, computer languages do not change the way computer hardware does. The basic principles remain intact with time and the information in this book is sound data which bridges the gap between specific compiler development and language mathematical theory. Prerequisites for reading this book are basic algebra and introductory computer science. Objectives for reading it would be to augment compiler writing, natural language translation or computational linguistics. The examples used by Weingarten are simplified to show the basic structure, and the text is written in clear, every-day English. Some of the chapters are entitled: Translation of Arithmetic Expressions, Formal Models of Grammars, Structure of Binary Translation Trees, Restricted Grammars. Although the book is recommended as a supplementary text in compiler writing at the college level, many computer hobbyists who are now involved with higher level languages will find this book a valuable aid.

ARTICLE REVIEWS

"Custom Programming/ Analysis in the Small Business Environment,"
By Ted Cary,
Computer, September 1976

This is an overview article on small business computing (no 8080 listings!). Cary presents a taxonomy of businesses, configuration and service alternatives, an outline of the programming analysis process and an excellent bibliography. Those who are toying with the idea of using micros in their business or in developing software packages should be versed in this sort of overall picture.

Other articles in this issue of *Computer* cover the application of mini computers in specific business areas.

"Marketing The Micro",
By Richard Shapiro,
Mini Micro Systems, Sept. 1976

This article would be of interest to you if you are thinking of bringing out some sort of product. It runs down the author's six month effort to get a PDP-11 floppy disk controller on the market.

"The Curious Life of Alan Turning",
By Dr. Molly Gleisa,
Computer Decisions, August, 1976

This is a brief biography of Alan Turning. Turning is well known as a mathematician – a colleague of men such as Von Neumann, Church and Post who began work on the

mathematics of computation. One thinks of Turning machines, proofs of compatibility and Turning's Test for intelligent behavior, but until reading this article, I had no idea that Turning was a machine designer (he invented the index register), an engineer and an eccentric. The thing that endears him most to me is the fact that he was an athlete and "thought nothing of running 40 miles to London to attend conferences."

"Computers and Society: Films – An Inventory",
Computers and People, July, 1976

An inventory of about 50 non-technical films dealing with the relations of computers to people, society and human concerns. Gives an abstract, running time and rental information for each.

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Periodicals That Progressive Scientists Should Know About

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For Sale: Two REDCOR 12bit D/A modules. $10 each. MARK-8 corrections kit; new schematics, instructions for mods, parts. Fixes clock phases, memory address levels, console problems, system glitches, interrupt structure and other important bugs. $10 each. Ronald Carlson, 14014 Panay Way # 255, Marina del Rey, CA 90291

Basic Super Star Trek: Has features of Super Star Trek as found in "The Best of Creative Computing – Vol I" but optimized to fit in Altair 8800 with 16K total memory (including MITS 8K BASIC). Will run with other systems. High quality paper source is only $3.00. Includes 15 page description of game, program variables and routines. A MITS compatible tape cassette is also available for $6.00 to cover tape, copying, and handling costs – supplied on high-quality Maxwell UD tape. Send to: D.C. Mitchell, 2S624 Mulberry Ct., Warrenville, Ill. 60555.

Wanted: Complete documentation and/or manuals, schematics, service data for Burroughs Model D8565 Computer Display Terminal Unit – Keyboard, display, and logic units. Please contact – Augusto H. Nicolella, 1610 Iseminger Street, Philadelphia, Pennsylvania 19148, (215) 468-4338.

For Sale: SPHERE 320 with SIM board (TTY and 2 cassette interfaces), video monitor, 4K RAM. Assembled, burned in, working. Parts for MODEM. Immediate delivery! List about $1875; asking $1600. Richard Tenney, RFD 2, Amherst, MA 01002, (413) 323-4555 or (207) 633-2638.

For Sale: Model 15 TTY in good working condition. $95 plus shipping. C. Ascolillo, Park Lane, N. Windham, MN 04062, (207) 892-6130.

For Sale: ICC/MILGO 4400/48, 4800 Baud modems. List is now $4800 each. Will sell two for $800 each or both for $1500. Modems will operate in full duplex or simple mode over normal unconditioned phone lines. Equalizers are built in and interfaced through EIA-RS232 or CCITT-Y.24. Also one ADS-448 data concentrator (4 low-speed lines – one 4800 baud line), for $600. Jim Brick, 820 Sweetbay Dr., Sunnyvale, CA 94086 (408) 247-0312.

Want: Back issues of SCCS INTERFACE to complete my collection. Need February and/or March you can do without. Send your asking price to: Keith B. Petersen, 1418 Genesee Ave., Royal Oak, MI 48073 (313) 588-0184.

For Sale: Altair 8800 microprocessor with homebrew cover panel and power supply. Has one kilobyte of memory, three-quarters of which is fast memory (no waits). Assembled, all for $450, or make offer, all or part. Write: Steve Ingoglia, 3121 W. Colorado Ave., Denver, Colorado 80219.

For Sale: PDS-3 mini with full documentation, loader, 8K Core and TTY. Features multi-level indirect and Auto inc/dec addressing. Full floating point hardware arith. Also have FAA 2 deck 4 chan R/R tape system for mass storage $2450 complete. (714) 624-6566 after 7 P.M. Al Mattal, 25501 El Picador, Mission Viejo, California 92675

For Sale: MITS very low cost terminal, fully assembled, no case, $85.00. MITS four slot mother board, used, somewhat beat-up but servicable, $8.00. IBM 2311-type disc drive, manufactured by Control Data Corporation, 7.5 megabytes of storage for the price of a single floppy disc drive, $850.00. Will trade for ASR33 teletype, Altair compatible memory, or ?. James R. Einolf, 3900 Fox Dr., Loveland, CO 80537

Classified

Homebrew Hobbyist: There is something better than a teletype! We offer used IBM selectric printers, 15.4cps, with 30cps photoelectric 8 level paper tape reader and 18cps punch. Several models available. S.A.S.E. for our latest price sheet on "Used Computer I/O Devices". ABBOTT & LIND INC., 1909 N.E. Union Ave., Portland, OR 97212, (503) 282-3245.

Up Date

Continued from Page 33

National Semiconductor Reports Increased Sales, Lower Earnings For First Fiscal Quarter

Santa Clara, California...National Semiconductor Corp. reported today that sales for its 16-week, first fiscal quarter, ending September 19, were $112,007,000, up 36 percent from sales of $82,386,000 reported for a comparable period last year.

National Semiconductor:
Thanks folks!

SCCS:
You're welcome!

Humane Computing Survey

I am working on a survey of the humanistic use of computers and would like to get in touch with other people who are interested in this field. I want to learn about what can, and is, being done to make the use of computers as humanized as possible. More specifically, I want to know:

- What are the potentially humane applications of computers?
- What are the important ingredients in humanized computer systems?
- What is currently being done in the field of humane computing, both in terms of theory and practice?
- Which individuals and groups are actively doing this work?
- What are their particular goals and objectives?
- What are the results so far?
- What are the major factors determining their successes and failures?

I would like to hear from anyone who can contribute to answering such questions. They should write to me describing their thoughts, fantasies, plans and experiences related to the humane use of computers. Besides corresponding with people, I hope to actually visit and talk to as many contacts as possible. All of the material I collect in this way will go towards the publication of a survey of humane computing.

Andrew Clement
789 West 18th Ave.
Vancouver, BC
Canada V5ZIWI
(604) 874-6740

Hassles With Big Brother

Why does the computer dun you for money you don't owe? Or give you a tax refund you don't dare keep?

According to Stanford Research Institute (SRI), it isn't the computer that makes these mistakes. It is the human programmer analyst. In writing instructions for the computer, the programmer neglects to consider all possible situations that might arise.

SRI has been awarded a three-year $300,000 contract by the National Science Foundation to find out why such problems occur and how they can be corrected. The Institute is calling for the general public and interested organizations to send in case histories of incidents where the use of the computer has caused problems, and to supply supporting documentation, if possible. Responses will be treated confidentially, if desired.

The information should be sent to Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, CA 94025, attention: Donn B. Parker. Parker, who is principal investigator for the study, points out that in addition to looking at such bureaucratic computer problems, he and his team will also consider problems of computer abuse by white collar criminals. Research in the latter area has been underway at SRI since 1970.

8080 BASIC Compiler in Public Domain

Release of the 8080 BASIC software compiler developed by Livermore Labs, Livermore, California, as announced last July in *Electronic Engineering Times,* is now a reality. The software is a stripped-down version of BASIC with a floating point package that can run as a local interpreter in approximately 5,000 memory locations. To assure that the software effectively reaches as many as possible, Livermore Labs' Design Engineer, Eugene Fisher has advised us that listings may be obtained through the Intel Users Library, National Technical Information Service, and *Dr. Dobb's Journal.*

Dr. Dobb's Journal, reports editor Jim Warren, will print the complete program listing in an early fall issue. If you don't already subscribe to *Dr. Dobb's,* we think that one issue would be well worth the price of the subscription at $10 per year. You may write them at P.O. Box 310, Menlo Park, CA 94025.

The 8080 BASIC compiler is also available through the National Technical Information Service. Contact them by writing to the attention of the U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

To become a member of the Intel User's Library, either payment of $100 for a year's membership is required, or a program must be donated. With membership, the User Library provides a complete manual of programs in the library, with updates and additions supplied during the year. For more information, write User's Library, Microcomputer Systems, Intel Corp., 3065 Bowers Ave., Santa Clara, CA 95051.

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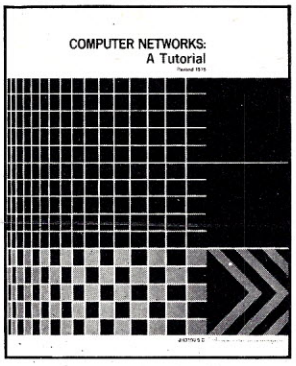
COMPUTER NETWORKS

Revised 1976 (296 pages)



This most recent revision of the IEEE Computer Society's most popular tutorial covers the areas of network topology and communications media, network technology and its effect on network performance, resource sharing requirements and techniques, and new approaches to network performance measurement, access, and management. Editors Marshall Abrams, Robert P. Blanc, and Ira W. Cotton of the NBS present concepts and terminology followed by specific examples. Presentation stresses breadth rather than depth, and as a result provides novices with a firm basis for becoming better educated on specific topics.

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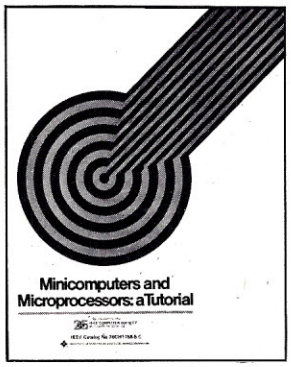

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